

2006 Buick Lucerne CXS

2006 BRAKES Disc Brakes - Lucerne

2006 BRAKES**Disc Brakes - Lucerne****SPECIFICATIONS****FASTENER TIGHTENING SPECIFICATIONS****Fastener Tightening Specifications**

Application	Specification	
	Metric	English
Front Brakes		
• Brake Caliper Bracket Bolt	180 N.m	133 lb ft
• Brake Caliper Pin Bolt	36 N.m	27 lb ft
• Brake Hose to Caliper Bolt	40 N.m	30 lb ft
• Brake Rotor Mounting Screw	12 N.m	106 lb in
• Brake Caliper Bleeder Valve	13 N.m	115 lb in
Rear Brakes		
• Brake Caliper Bracket Bolt	128 N.m	94 lb ft
• Brake Caliper Pin Bolt	34 N.m	25 lb ft
• Brake Hose to Caliper Bolt	40 N.m	30 lb ft
• Brake Rotor Mounting Screw	12 N.m	106 lb in
• Brake Caliper Bleeder Valve	13 N.m	115 lb in

DISC BRAKE COMPONENT SPECIFICATIONS**Disc Brake Component Specifications**

Application	Specification	
	Metric	English
Front Brake Pads		
• Taper	0.15 mm	0.006 in
Front Brake Rotors - V6		
• Rotor Diameter	303.0 mm	11.9 in
• Rotor Minimum Thickness	28.6 mm	1.126 in
• Rotor Maximum Allowable Assembled Lateral Runout	0.06 mm	0.002 in
• Rotor Maximum Allowable Scoring	1.50 mm	0.059 in

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• Rotor Maximum Allowable Assembled Lateral Runout	0.025 mm	0.001 in
• Rotor Thickness - New	30 mm	1.181 in
Front Brake Rotor - V8		
• Rotor Diameter	323 mm	12.72 in
• Rotor Minimum Thickness	28.6 mm	1.126 in
• Rotor Maximum Allowable Assembled Lateral Runout	0.06 mm	0.002 in
• Rotor Maximum Allowable Scoring	1.50 mm	0.059 in
• Rotor Maximum Thickness Variation	0.025 mm	0.001 in
• Rotor Thickness - New	30 mm	1.181 in
Rear Pads		
• Taper	0.15 mm	0.006 in
Rear Brake Rotor		
• Rotor Diameter	292.00 mm	11.50 in
• Rotor Minimum Thickness	10.5 mm	0.413 in
• Rotor Maximum Allowable Assembled Lateral Runout	0.06 mm	0.002 in
• Rotor Maximum Allowable Scoring	1.50 mm	0.059 in
• Rotor Maximum Allowable Thickness Variation	0.025 mm	0.001 in
• Rotor Thickness - New	12.00 mm	0.472 in
All brake rotors have a minimum thickness dimension cast into them. Replace any rotor that is worn or machine below this specification.		

DIAGNOSTIC INFORMATION AND PROCEDURES**DIAGNOSTIC STARTING POINT - DISC BRAKES**

Begin the disc brake system diagnosis with **Diagnostic Starting Point - Hydraulic Brakes** . The use of the Diagnostic Starting Point will lead to the identification of the correct procedure for diagnosing the system and where the procedure is located.

BRAKE ROTOR THICKNESS MEASUREMENT

CAUTION: Refer to **Brake Dust Caution** .

1. If the inboard friction surface of the brake rotor is not accessible, reposition and support the caliper with the brake pads. Refer to **Front Disc Brake Pads Replacement** and/or **Rear Disc Brake Pads Replacement**.
2. Clean the friction surfaces of the brake rotor with denatured alcohol or an equivalent approved brake cleaner.

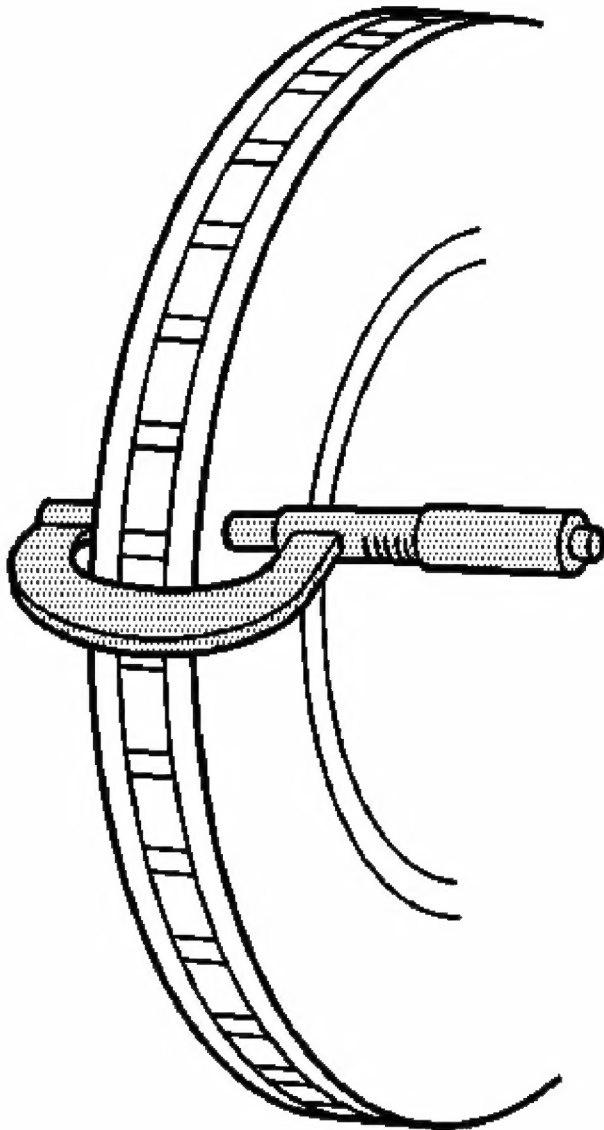


Fig. 1: Measuring Brake Rotor Thickness
Courtesy of GENERAL MOTORS CORP.

3. Using a micrometer calibrated in thousandths-of-a-millimeter or ten-thousandths-of-an-inch, measure and record the thickness of the brake rotor at four or more points, evenly spaced around the rotor.

Ensure that the measurements are only taken within the friction surfaces and that the micrometer is positioned the same distance from the outer edge of the rotor, about 13 mm (1/2 in), for each measurement.

4. Compare the lowest thickness measurement recorded to the following specifications. Refer to **Disc Brake Component Specifications**.
5. If the lowest thickness measurement of the brake rotor is above the minimum thickness specification, the rotor may be able to be refinished, depending upon surface and wear conditions which may be present.
6. If the lowest thickness measurement of the brake rotor is below the minimum allowable thickness after refinishing specification, the rotor may not be refinished.
7. If the lowest thickness measurement of the brake rotor is below the minimum thickness specification, the rotor requires replacement.

BRAKE ROTOR THICKNESS VARIATION MEASUREMENT

CAUTION: Refer to **Brake Dust Caution** .

IMPORTANT: Any disc brake rotor that exhibits thickness variation exceeding the maximum acceptable level must be refinished or replaced. Thickness variation exceeding the maximum acceptable level can cause brake pulsation.

1. If the inboard friction surface of the brake rotor is not accessible, reposition and support the caliper with the brake pads. Refer to **Front Disc Brake Pads Replacement** and/or **Rear Disc Brake Pads Replacement**.
2. Clean the friction surfaces of the brake rotor with denatured alcohol or an equivalent approved brake cleaner.

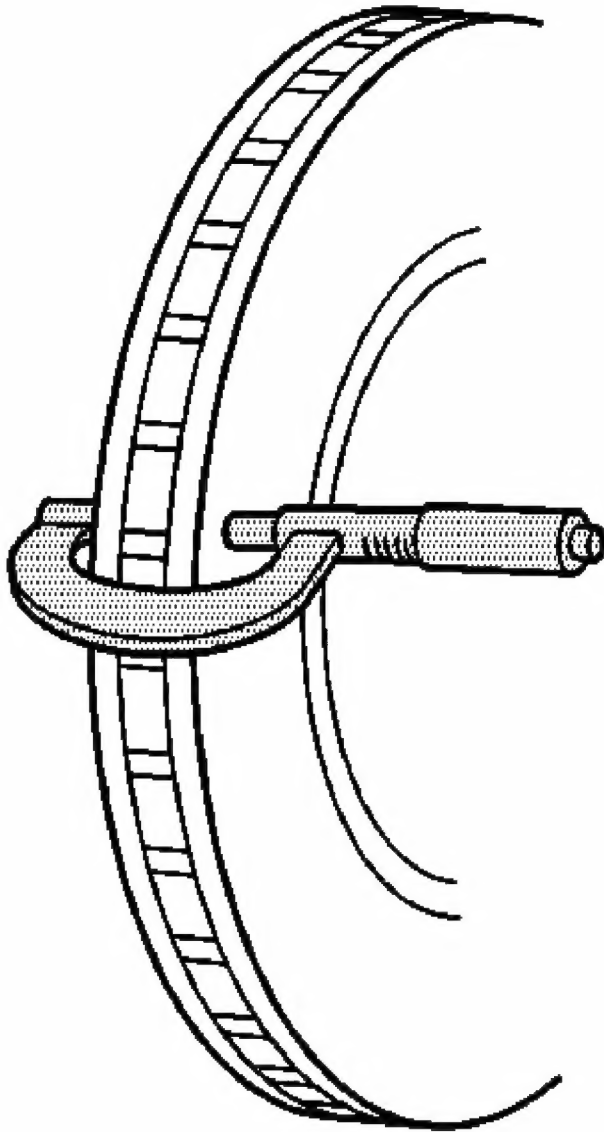


Fig. 2: Measuring Brake Rotor Thickness
Courtesy of GENERAL MOTORS CORP.

3. Using a micrometer calibrated in thousandths-of-a-millimeter or ten-thousandths-of-an-inch, measure and record the thickness of the brake rotor at four or more points, evenly spaced around the rotor.

Ensure that the measurements are only taken within the friction surfaces and that the micrometer is positioned the same distance from the outer edge of the rotor, about 13 mm

(1/2 in), for each measurement.

4. Calculate the difference between the highest and lowest thickness measurements recorded to obtain the amount of thickness variation.
5. Compare the thickness variation measurement to the following specification:

Specification: Brake rotor maximum allowable thickness variation: 0.02 mm (0.001 in)

IMPORTANT: Whenever a brake rotor is refinished or replaced, the assembled lateral runout (LRO) of the rotor must be measured to ensure optimum performance of the disc brakes.

6. If the brake rotor thickness variation measurement exceeds the specification, the rotor requires refinishing or replacement.

BRAKE ROTOR SURFACE AND WEAR INSPECTION

CAUTION: Refer to Brake Dust Caution .

1. If the inboard friction surface of the brake rotor is not accessible, reposition and support the caliper with the brake pads. Refer to Front Disc Brake Pads Replacement and/or Rear Disc Brake Pads Replacement.
2. Clean the friction surfaces of the brake rotor with denatured alcohol or an equivalent approved brake cleaner.
3. Inspect the friction surfaces of the brake rotor for the following Braking Surface Conditions:
 - Heavy rust and/or pitting

Light surface rust can be removed with an abrasive disc. Heavy surface rust and/or pitting must be removed by refinishing the rotor.

 - Cracks and/or heat spots
 - Excessive blueing discoloration
4. If the friction surfaces of the brake rotor exhibit one or more of the Braking Surface Conditions, the rotor requires refinishing or replacement.

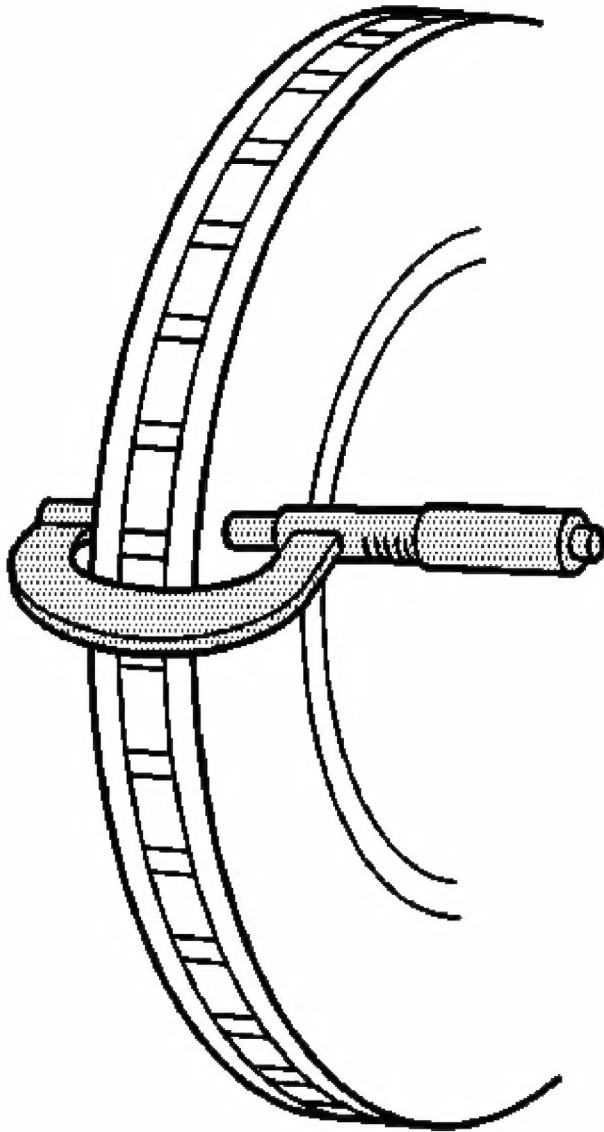


Fig. 3: Measuring Brake Rotor Thickness
Courtesy of GENERAL MOTORS CORP.

5. Using a micrometer calibrated in thousandths-of-a-millimeter or ten-thousandths-of-an-inch, measure and record the scoring depth of any grooves present on the rotor friction surfaces.
6. Compare the groove scoring depth recorded to the following specification:

Specification: Brake rotor maximum allowable scoring: 1.50 mm (0.059 in)

7. If the brake rotor scoring depth exceeds the specification or if an excessive amount of scoring is present, the rotor requires refinishing or replacement.

BRAKE ROTOR ASSEMBLED LATERAL RUNOUT MEASUREMENT**Tools Required**

- **J 39544-KIT** Torque-Limiting Socket Set or equivalent. See Special Tools.
- **J 41013** Rotor Resurfacing Kit. See Special Tools.
- **J 42450-A** Wheel Hub Resurfacing Kit. See Special Tools.
- **J 45101** Hub and Wheel Runout Gage. See Special Tools.
- **J 45101-100** Conical Brake Rotor Washers. See Special Tools.

CAUTION: Refer to Brake Dust Caution .

- IMPORTANT:**
- Brake rotor assembled lateral runout (LRO) exceeding the maximum allowable specification can cause thickness variation to develop in the brake rotor over time, usually between 4 800-11 300 km (3,000-7,000 mi).
 - Brake rotor thickness variation **MUST** be checked **BEFORE** checking for assembled lateral runout (LRO). Thickness variation exceeding the maximum acceptable level can cause brake pulsation. Refer to Brake Rotor Thickness Variation Measurement.

Measurement Procedure

1. Matchmark the position of the brake rotor to the wheel studs if this has not been done already.

IMPORTANT: Whenever the brake rotor has been separated from the hub/axle flange, any rust or contaminants should be cleaned from the hub/axle flange and the brake rotor mating surfaces. Failure to do this may result in excessive assembled lateral runout (LRO) of the brake rotor, which could lead to brake pulsation.

2. Inspect the mating surface of the hub/axle flange and the brake rotor to ensure that there are no foreign particles, corrosion, rust or debris remaining. If the wheel hub/axle flange and/or if the brake rotor mating surfaces exhibit these conditions, perform the following steps:

1. Remove the brake rotor from the vehicle. Refer to **Front Brake Rotor Replacement** and/or **Rear Brake Rotor Replacement** .
 2. Using the **J 42450-A** , thoroughly clean any rust or corrosion from the mating surface of the hub/axle flange. See **Special Tools**.
 3. Using the **J 41013** , thoroughly clean any rust or corrosion from the mating surface of the brake rotor. See **Special Tools**.
 4. Clean the friction surfaces of the brake rotor with denatured alcohol or an equivalent approved brake cleaner.
3. Install the rotor to the hub/axle flange using the matchmark made prior to removal.

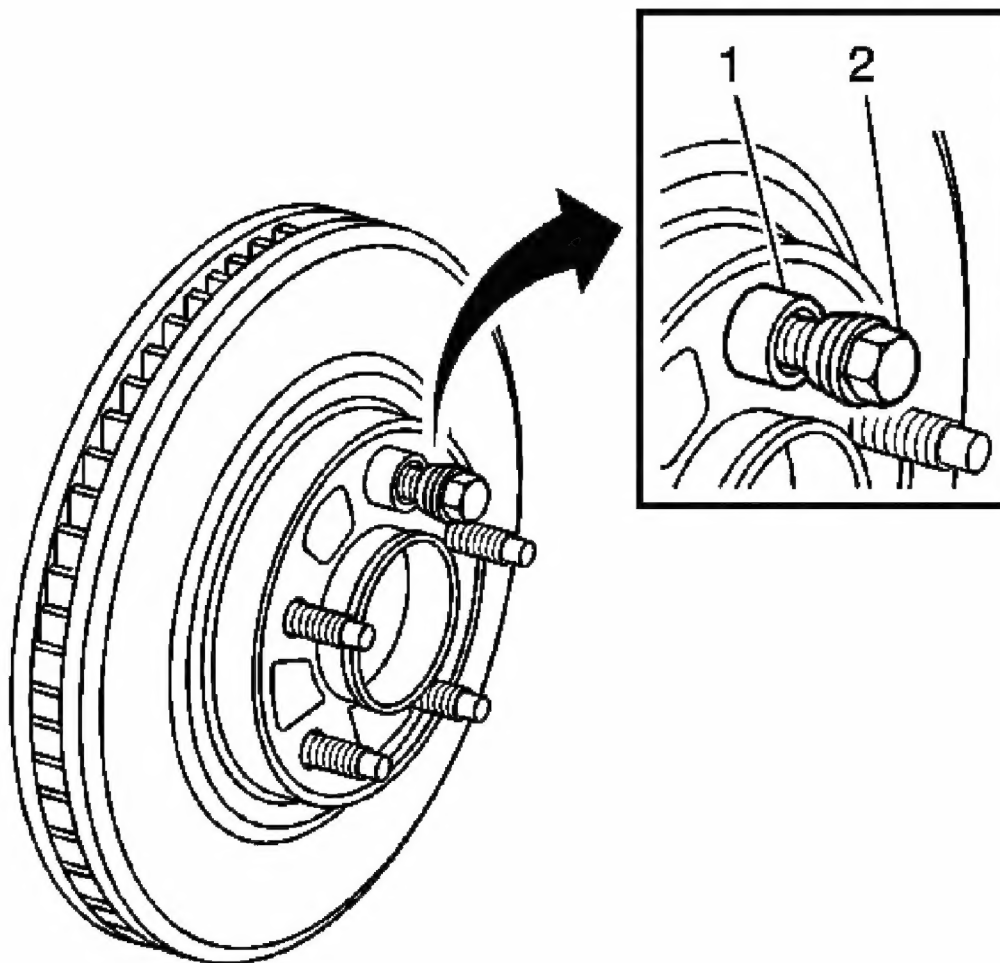


Fig. 4: Identifying J 45101-100 & Lug Nut
Courtesy of GENERAL MOTORS CORP.

4. Hold the rotor firmly in place against the hub/axle flange and install one of the **J 45101-100** (1) and one lug nut (2) onto the upper-most wheel stud. See **Special Tools**.
5. Continue to hold the rotor secure and tighten the lug nut firmly by hand.

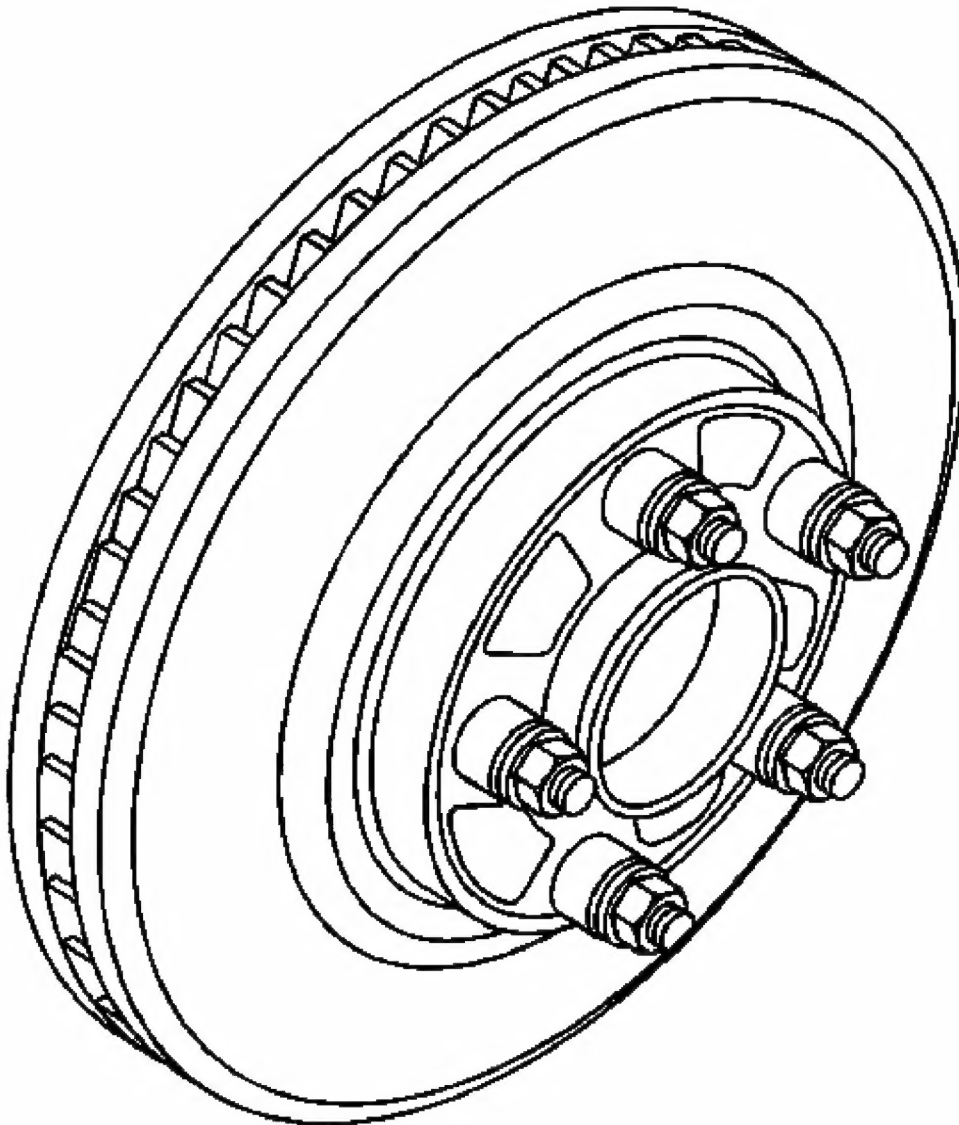


Fig. 5: Installing All J 45101-100s & Lug Nuts
Courtesy of GENERAL MOTORS CORP.

6. Install the remaining **J 45101-100** and lug nuts onto the wheel studs and tighten the nuts firmly by hand in a star-pattern. See **Special Tools**.

7. Using the **J 39544-KIT** or equivalent, tighten the lug nuts in a star-pattern to specification, in order to properly secure the rotor. See **Special Tools**. Refer to **Tire and Wheel Removal and Installation** .
8. If the brake rotor has been REFINISHED or REPLACED with a new rotor, proceed to step 14.
9. If the brake rotor meets the following criteria, proceed to step 10.
 - The rotor is within specifications and is being REUSED.
 - The rotor has NOT been refinished.
 - The rotor does NOT exhibit thickness variation exceeding the maximum allowable level.

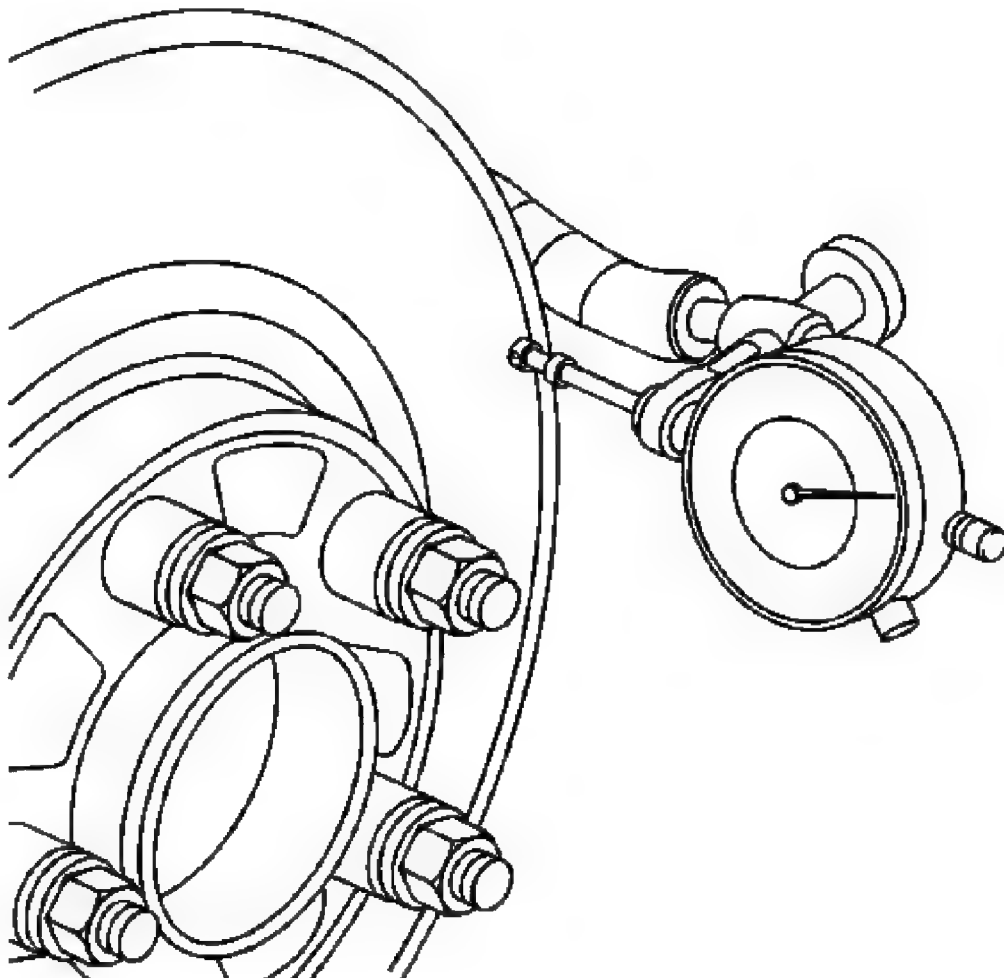


Fig. 6: Mounting Dial Indicator To Measure Lateral Runout

Courtesy of GENERAL MOTORS CORP.

10. Mount a dial indicator, **J 45101** or equivalent, to the steering knuckle and position the indicator button so it contacts the brake rotor friction surface at a 90 degree angle, approximately 13 mm (0. See **Special Tools**.5 in) from the outer edge of the rotor.
11. Measure and record the assembled LRO of the brake rotor.
 1. Rotate the rotor until the lowest reading is displayed on the indicator dial, then set the dial to zero.
 2. Rotate the rotor until the highest reading is displayed on the dial.
 3. Mark the location of the high spot relative to the nearest wheel stud or studs.
 4. Measure and record the amount of LRO.
12. Compare the brake rotor assembled LRO to the following specification:

Specification:

- Front brake rotor maximum allowable assembled lateral runout: 0.05 mm (0.002 in)
- Rear brake rotor maximum allowable assembled lateral runout: 0.05 mm (0.002 in)

13. If the brake rotor assembled LRO is within specifications, proceed to step 18.

If the brake rotor assembled LRO exceeds the specification, refinish the rotor to ensure true parallelism. Refer to **Brake Rotor Refinishing**. After refinishing the rotor, proceed to step 14.

14. Mount a dial indicator, **J 45101** or equivalent, to the steering knuckle and position the indicator button so it contacts the brake rotor friction surface at a 90 degree angle, approximately 13 mm (0. See **Special Tools**.5 in) from the outer edge of the rotor.
15. Measure and record the assembled LRO of the brake rotor.
 1. Rotate the rotor until the lowest reading is displayed on the indicator dial, then set the dial to zero.
 2. Rotate the rotor until the highest reading is displayed on the dial.
 3. Mark the location of the high spot relative to the nearest wheel stud or studs.
 4. Measure and record the amount of LRO.
16. Compare the brake rotor assembled LRO to the following specification:

Specification:

- Front brake rotor maximum allowable assembled lateral runout: 0.05 mm (0.002 in)
- Rear brake rotor maximum allowable assembled lateral runout: 0.05 mm (0.002 in)

17. If the brake rotor assembled LRO measurement exceeds the specification, bring the LRO to within specifications. Refer to **Brake Rotor Assembled Lateral Runout Correction**.
18. If the brake rotor assembled LRO measurement is within specification, install the brake caliper and depress the brake pedal several times to secure the rotor in place before removing the **J 45101-100** and the lug nuts. See **Special Tools**.

BRAKE PAD INSPECTION

CAUTION: Refer to **Brake Dust Caution** .

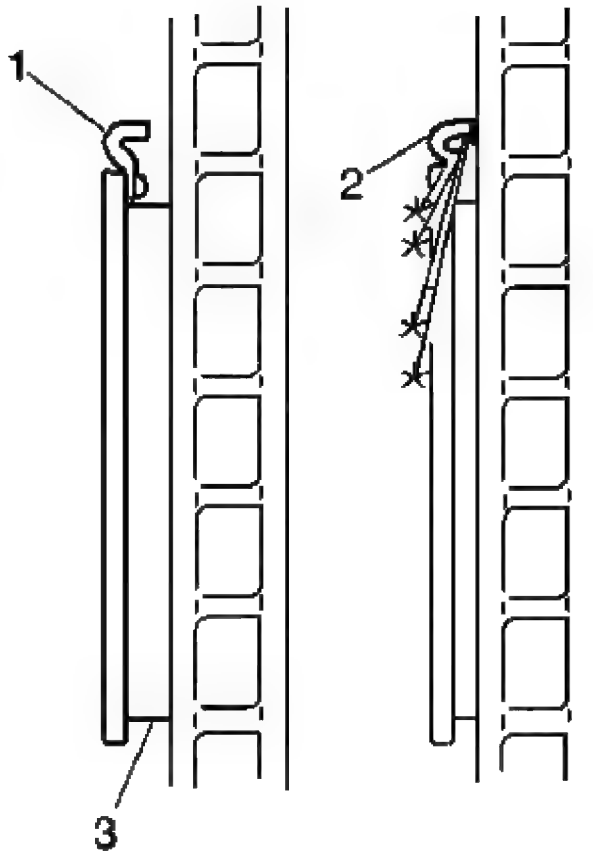


Fig. 7: View Of Brake Pads & Audible Wear Sensors
Courtesy of GENERAL MOTORS CORP.

- Inspect the disc brake pads at regular intervals or whenever the tire and wheel assemblies

are removed from the vehicle.

- If replacement is necessary, always replace disc brake pads in axle sets.
- Inspect both edges of the disc brake pad friction surfaces (3). The highest rate of wear normally occurs at the trailing edge of the disc brake pads.
- Inspect the thickness of the disc brake pads (3) in order to ensure that they have not worn prematurely. The disc brake pad wear should be approximately even per axle set.
- Both front and rear disc brake pads have integral, audible wear sensors (1). When the disc brake pad wear reaches the minimum allowable thickness, the wear sensor contacts the disc brake rotor (2). The wear indicator will then produce an audible, high-pitched warning noise during wheel rotation.
- Replace the disc brake pads when the friction surface (3) is worn to within 0.76 mm (0.030 in) of the mounting plates.
- Remove the brake calipers and inspect the friction surfaces of the inner and outer disc brake pads to ensure that they are level. Place the disc brake pad friction surfaces together and measure the gap between the surfaces. If more than 0.13 mm (0.005 in) gap exists midway between the length of the disc brake pads, replace the disc brake pads.
- Verify that any disc brake pad shims that may be required are in place and not damaged or excessively corroded. Replace any missing or damaged shims in order to preserve proper disc brake performance.
- Replace the disc brake pads if any have separated from the mounting plates.
- Inspect the disc brake pads friction surfaces for cracks, fractures or damage which may cause noise or otherwise impair disc brake performance.

BRAKE CALIPER INSPECTION

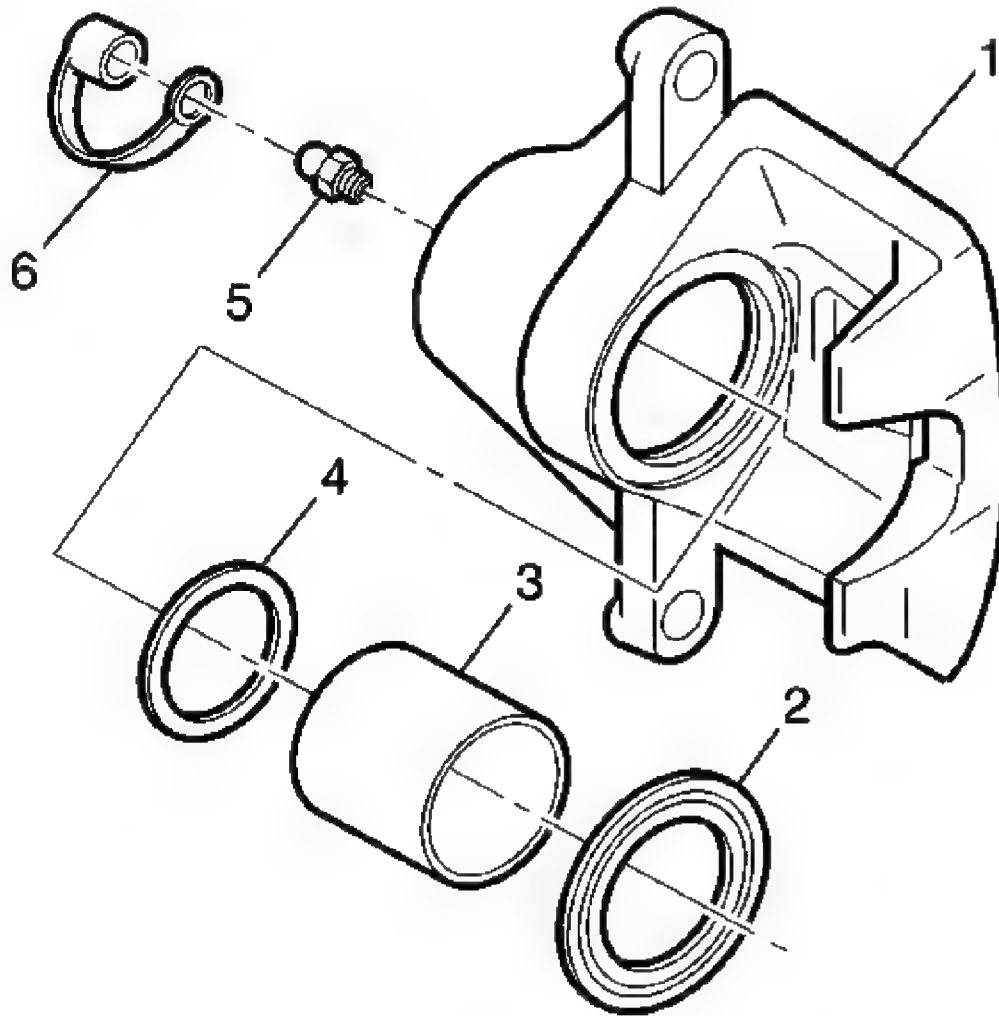


Fig. 8: Exploded View Of Brake Caliper
Courtesy of GENERAL MOTORS CORP.

CAUTION: Refer to Brake Dust Caution .

CAUTION: Refer to Brake Fluid Irritant Caution .

1. Inspect the brake caliper housing (1) for cracks, excess wear, and/or damage. If any of these conditions are present, the brake caliper requires replacement.
2. Inspect the caliper piston dust boot seal (2) for cracks, tears, cuts, deterioration and/or

improper seating in the caliper body. If any of these conditions are present, the brake caliper requires overhaul or replacement.

3. Inspect for brake fluid leakage around the caliper piston dust boot seal (2) and on the disc brake pads. If there is any evidence of brake fluid leakage, the brake caliper requires overhaul or replacement.

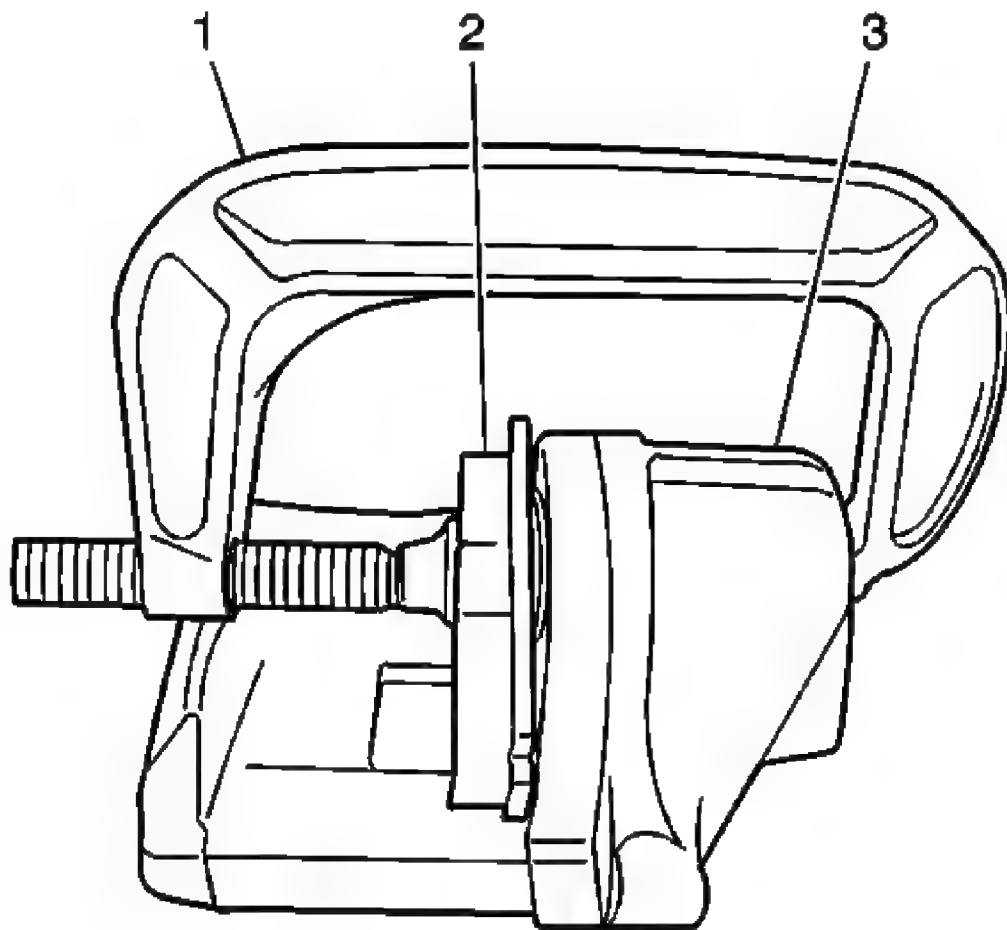


Fig. 9: Compressing Caliper Piston
Courtesy of GENERAL MOTORS CORP.

4. Inspect for smooth and complete travel of the caliper piston or pistons, into the caliper bore or bores:

The movement of a caliper piston into a caliper bore should be smooth and even. If a caliper piston is frozen or difficult to bottom, the caliper requires overhaul or replacement.

- For single piston caliper applications, insert a discarded inner brake pad (2) or block of wood in front of the piston. Using a large C-clamp (1) installed over the body of the caliper (3) and against the brake pad or block of wood, slowly bottom the piston in the bore.
- For dual piston caliper applications, insert a discarded inner brake pad (2) or block of wood in front of the pistons. Using 2 large C-clamps (1) installed over the body of the caliper (3) and against the brake pad or block of wood, slowly bottom the pistons evenly into the bores.

FRONT DISC BRAKE MOUNTING AND HARDWARE INSPECTION

CAUTION: Refer to Brake Dust Caution .

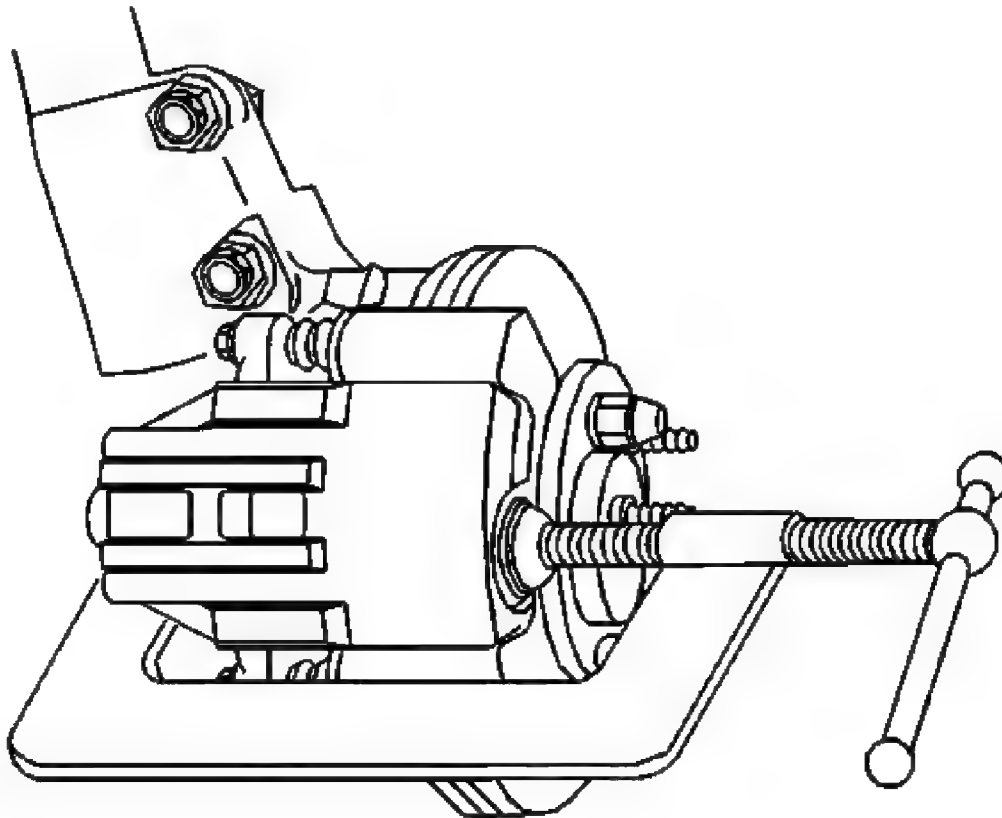


Fig. 10: Using C-Clamp To Compress Caliper Piston
Courtesy of GENERAL MOTORS CORP.

1. Install a large C-clamp, over the body of the brake caliper with the C-clamp ends against the rear of the caliper body and against the outer brake pad.
2. Tighten the C-clamp until the caliper piston is compressed into the caliper bore enough to allow the caliper to slide past the brake rotor.
3. Remove the C-clamp from the caliper.
4. Grasp the brake caliper and try to move the brake caliper up or down. The brake caliper should not have excessive looseness.
5. Grasp the brake caliper and try to move the brake caliper in and out. The brake caliper should slide smoothly with minimal force.

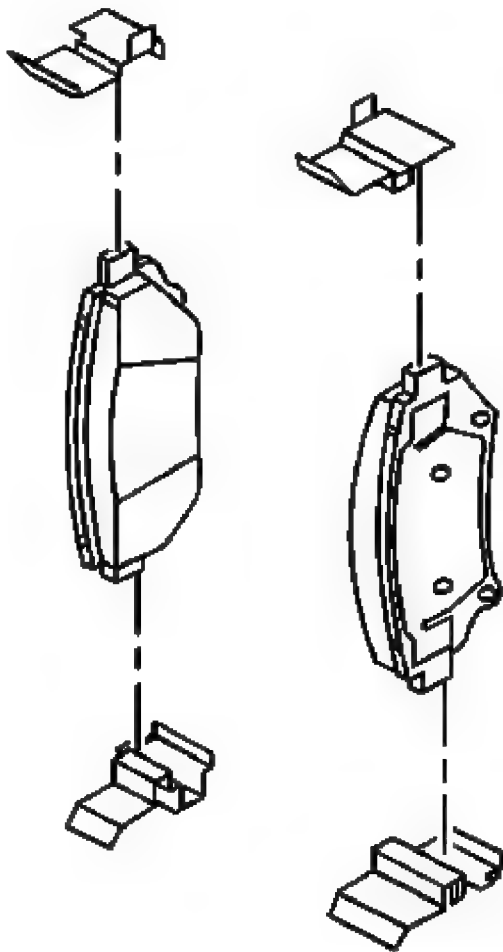


Fig. 11: Disc Brake Pad Mounting Hardware
Courtesy of GENERAL MOTORS CORP.

6. Inspect the brake caliper retainers.
7. Inspect the disc brake pad mounting hardware for the following:
 - Bent mounting tabs
 - Excessive corrosion
 - Looseness at the brake caliper mounting bracket
 - Looseness at the disc brake pads
 - Missing mounting hardware
8. If any of the conditions listed are found, the disc brake pad mounting hardware requires replacement.
9. Ensure the disc brake pads are held firmly in place on the brake caliper mounting bracket, yet slide easily on the mounting hardware without binding.
10. Inspect the brake caliper bolts for the following:
 - Bent or damaged brake caliper bolts
 - Bent or damaged brake caliper mounting bracket
 - Binding
 - Corrosion
 - Cracked or torn boots
 - Looseness in the brake caliper mounting bracket
 - Missing boots
 - Seizing
11. If any of the conditions listed are found, the brake caliper mounting hardware requires replacement.

REAR DISC BRAKE MOUNTING AND HARDWARE INSPECTION

CAUTION: Refer to Brake Dust Caution .

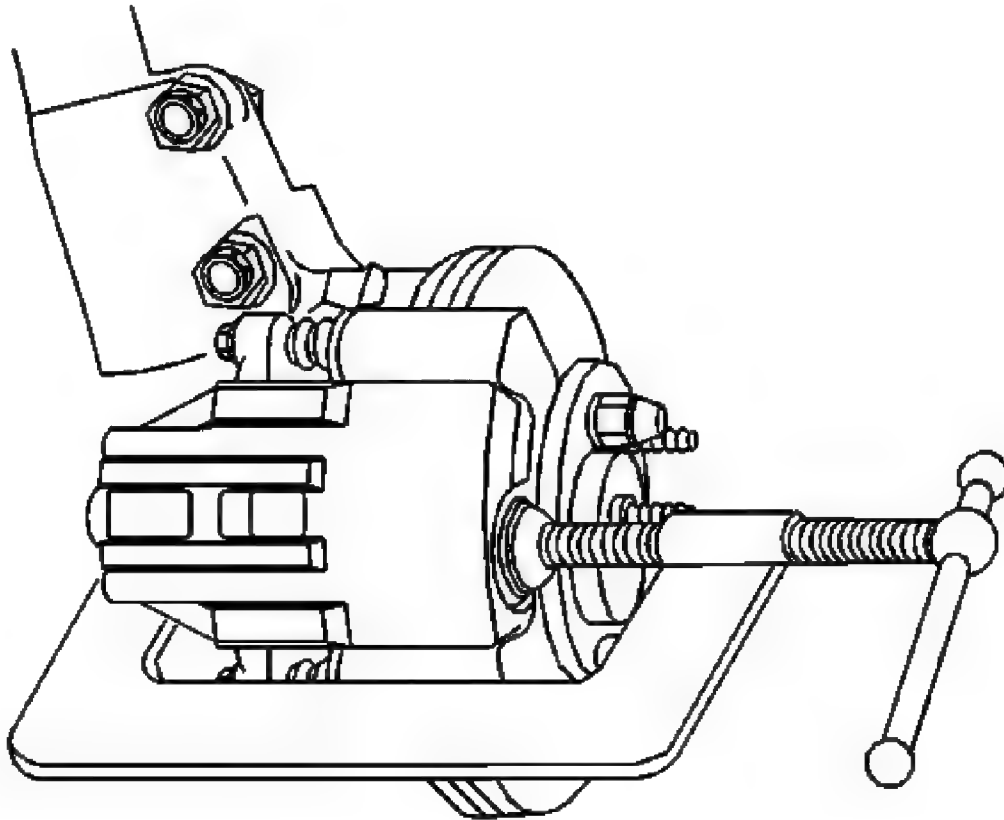


Fig. 12: Using C-Clamp To Compress Caliper Piston
Courtesy of GENERAL MOTORS CORP.

NOTE: When using a large C-clamp to compress a caliper piston into a caliper bore of a caliper equipped with an integral park brake mechanism, do not exceed more than 1 mm (0.039 in) of piston travel. Exceeding this amount of piston travel will cause damage to the internal adjusting mechanism and/or the integral park brake mechanism.

1. Compress the piston until resistance is felt, but no more than 1 mm of piston travel.
2. Grasp the brake caliper and try to move the brake caliper up or down. The brake caliper should not have excessive looseness.
3. Grasp the brake caliper and try to move the brake caliper in and out. The brake caliper should slide smoothly with minimal force.

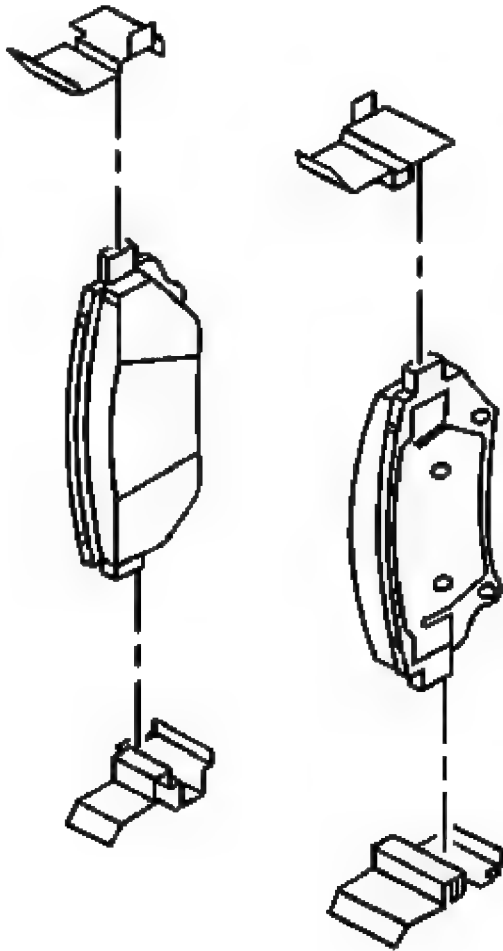


Fig. 13: Disc Brake Pad Mounting Hardware
Courtesy of GENERAL MOTORS CORP.

4. Inspect the brake caliper retainers.
5. Inspect the disc brake pad mounting hardware for the following:
 - Bent mounting tabs
 - Excessive corrosion
 - Looseness at the brake caliper mounting bracket
 - Looseness at the disc brake pads
 - Missing mounting hardware
6. If any of the conditions listed are found, the disc brake pad mounting hardware requires replacement.

7. Ensure the disc brake pads are held firmly in place on the brake caliper mounting bracket, yet slide easily on the mounting hardware without binding.
8. Inspect the brake caliper bolts for the following:
 - Bent or damaged brake caliper bolts
 - Bent or damaged brake caliper mounting bracket
 - Binding
 - Corrosion
 - Cracked or torn boots
 - Looseness in the brake caliper mounting bracket
 - Missing boots
 - Seizing
9. If any of the conditions listed are found, the brake caliper mounting hardware requires replacement.

REPAIR INSTRUCTIONS

FRONT DISC BRAKE PADS REPLACEMENT

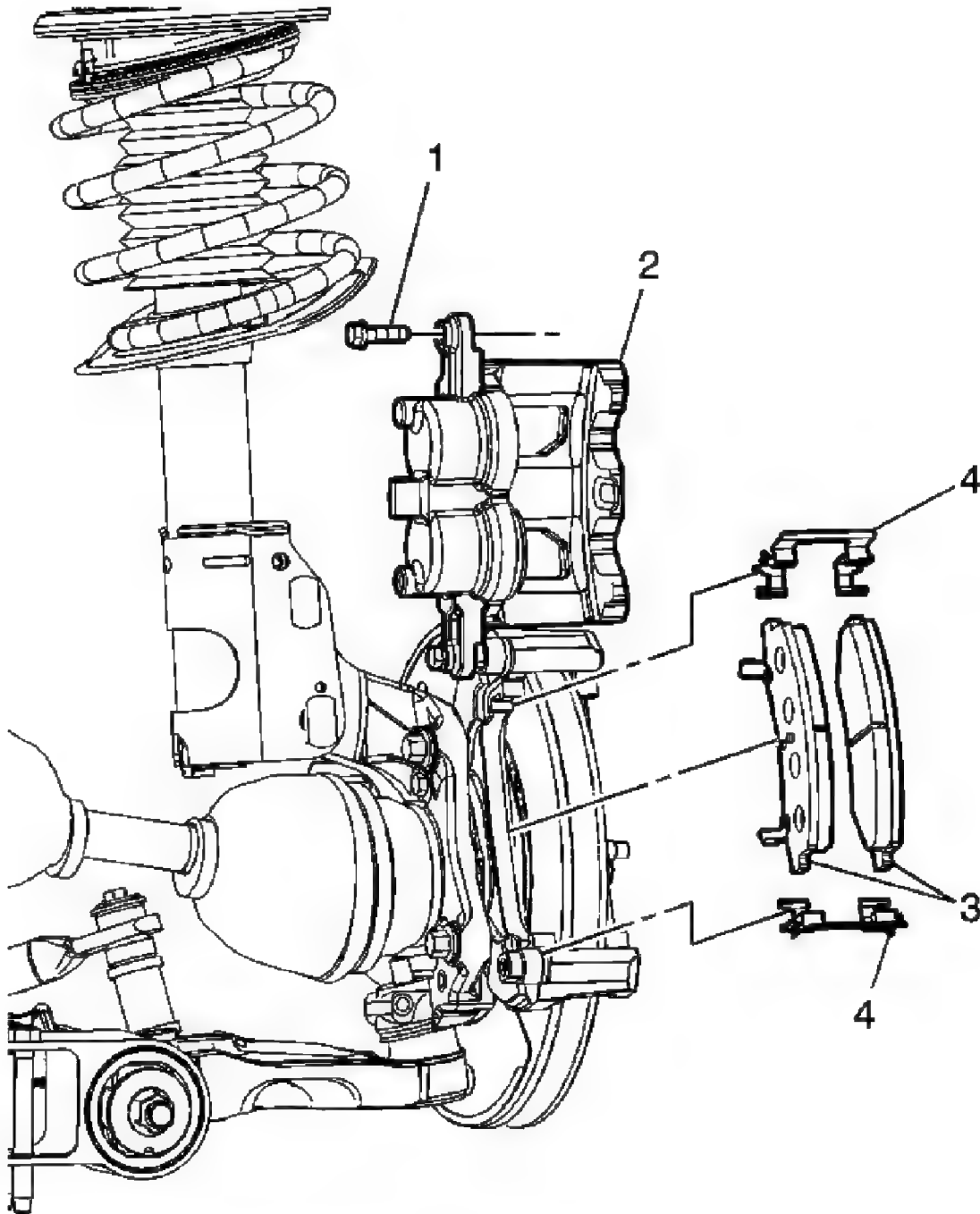


Fig. 14: Replacing Front Disc Brake Pads
 Courtesy of GENERAL MOTORS CORP.

Front Disc Brake Pads Replacement

Callout	Component Name
CAUTION: Refer to <u>Brake Fluid Irritant Caution</u> .	
CAUTION:	

Refer to **Brake Dust Caution** .

NOTE:

Refer to **Brake Fluid Effects on Paint and Electrical Components Notice** .

NOTE:

Support the brake caliper with heavy mechanic wire or equivalent, whenever it is separated from its mount and the hydraulic flexible brake hose is still connected. Failure to support the caliper in this manner will cause the flexible brake hose to bear the weight of the caliper, which may cause damage to the brake hose and in turn may cause a brake fluid leak.

Preliminary Procedures

1. Inspect the fluid level in the brake master cylinder reservoir.
2. If the brake fluid level is midway between the maximum-full point and the minimum allowable level, no brake fluid needs to be removed from the reservoir before proceeding.
3. If the brake fluid level is higher than midway between the maximum-full point and the minimum allowable level, remove brake fluid to the midway point before proceeding.
4. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
5. Remove the tire and wheel. Refer to **Tire and Wheel Removal and Installation** .

1	<p>Guide Pin Bolt</p> <p>NOTE: Refer to <u>Fastener Notice</u> .</p> <p>Tighten: 36 N.m (27 lb ft)</p> <p>IMPORTANT: Install an open end wrench to hold the caliper guide pin in line with the brake caliper while removing or installing the caliper guide pin bolt. DO NOT allow the open end wrench to come in contact with the brake caliper.</p> <p>Tip: Hold the brake caliper guide pin stationary when removing the guide pin bolt.</p>
2	<p>Brake Caliper</p> <p>Tip:</p> <ul style="list-style-type: none"> • Rotate the brake caliper up and to the rear until it rests on the mounting bracket and support with heavy mechanics wire or equivalent.

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	<ul style="list-style-type: none">• Place a block of wood or an old disc brake pad against the brake caliper pistons.• Using a suitable tool, slowly compress the brake caliper pistons squarely into the caliper bores.
3	Brake Pads
4	<p>Spring Retainer (Qty: 2)</p> <p>Tip:</p> <ol style="list-style-type: none">1. If replacing the brake pads, DO NOT reuse the spring retainers. Use NEW spring retainers only.2. With the engine OFF, gradually apply the brake pedal to approximately 2/3 of its travel distance.3. Slowly release the brake pedal.4. Wait 15 seconds, then repeat steps 2-3 until a firm brake pedal is obtained. This will properly seat the brake caliper pistons and brake pads.5. Fill the master cylinder reservoir to the proper level. Refer to <u>Master Cylinder Reservoir Filling</u>.6. Burnish the pads and rotors. Refer to <u>Brake Pad and Rotor Burnishing</u>.

REAR DISC BRAKE PADS REPLACEMENT

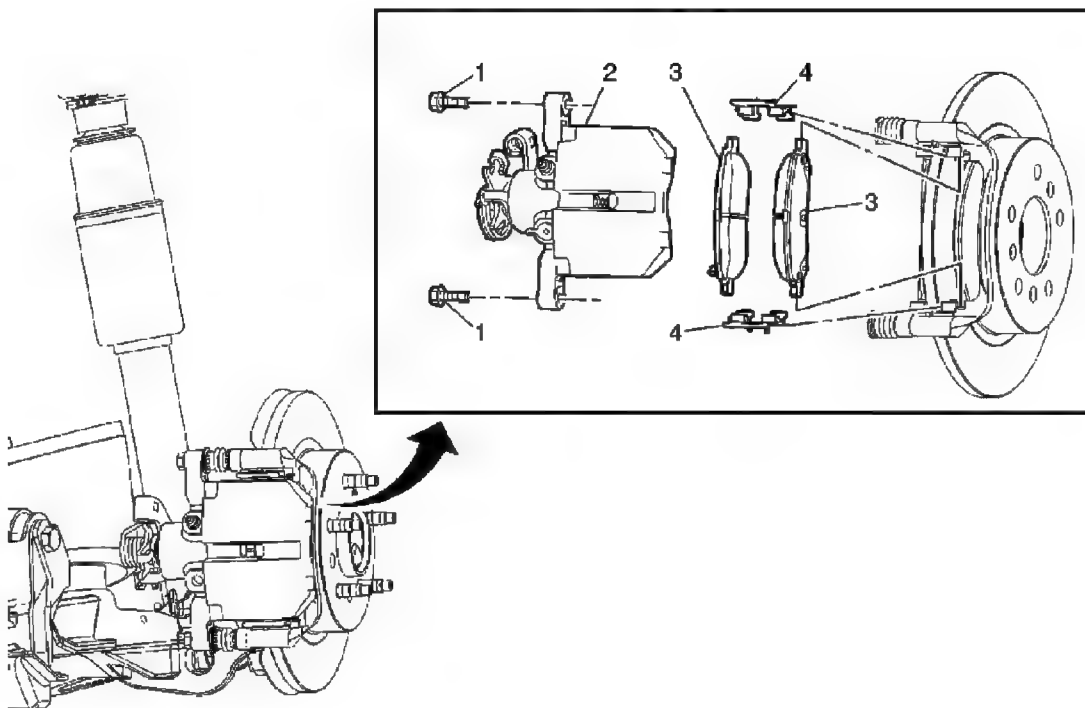


Fig. 15: Replacing Rear Disc Brake Pads
Courtesy of GENERAL MOTORS CORP.

Rear Disc Brake Pads Replacement

Callout	Component Name
CAUTION: Refer to <u>Brake Fluid Irritant Caution</u> .	
CAUTION: Refer to <u>Brake Dust Caution</u> .	
NOTE: Refer to <u>Brake Fluid Effects on Paint and Electrical Components Notice</u> .	
NOTE: Refer to <u>Fastener Notice</u> .	
NOTE: Support the brake caliper with heavy mechanic wire or equivalent, whenever it is separated from its mount and the hydraulic flexible brake hose is still connected. Failure to support the caliper in this manner will cause the flexible brake hose to bear the weight of the caliper, which may cause damage to the brake hose and in turn may cause a brake fluid leak.	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
Preliminary Procedures	
<ol style="list-style-type: none"> Inspect the fluid level in the brake master cylinder reservoir. If the brake fluid level is midway between the maximum-full point and the minimum allowable level, no brake fluid needs to be removed from the reservoir before proceeding. If the brake fluid level is higher than midway between the maximum-full point and the minimum allowable level, remove brake fluid to the midway point before proceeding. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . Remove the tire and wheel. Refer to <u>Tire and Wheel Removal and Installation</u> . 	
1	Guide Pin Bolts (Qty: 2) Tip: <ol style="list-style-type: none"> Remove the park brake cables from the retainers on the lower control arms. Using the appropriate tool, fully seat the piston.

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	Tighten: 34 N.m (25 lb ft)
2	Brake Caliper Tip: Support the caliper with heavy mechanics wire or equivalent.
3	Brake Pads Tip: When replacing the brakes pads, ensure the wear indicators are on the inboard pad at the bottom.
4	Spring Clips (Qty: 2) Tip: <ol style="list-style-type: none">1. With the engine OFF, gradually apply the brake pedal to approximately 2/3 of its travel distance.2. Slowly release the brake pedal.3. Wait 15 seconds, then repeat steps 1-2 until a firm brake pedal is obtained. This will properly seat the brake caliper pistons and brake pads.4. Fill the master cylinder reservoir to the proper level. Refer to <u>Master Cylinder Reservoir Filling</u> .5. Burnish the pads and rotors. Refer to <u>Brake Pad and Rotor Burnishing</u>.

BRAKE PAD AND ROTOR BURNISHING

CAUTION: Road test a vehicle under safe conditions and while obeying all traffic laws. Do not attempt any maneuvers that could jeopardize vehicle control. Failure to adhere to these precautions could lead to serious personal injury and vehicle damage.

CAUTION: Refer to **Brake Dust Caution** .

Burnishing the brake pads and brake rotors is necessary in order to ensure that the braking surfaces are properly prepared after service has been performed on the disc brake system.

This procedure should be performed whenever the disc brake rotors have been refinished or replaced, and/or whenever the disc brake pads have been replaced.

1. Select a smooth road with little or no traffic.
2. Accelerate the vehicle to 48 km/h (30 mph).

IMPORTANT: Use care to avoid overheating the brakes while performing

this step.

3. Using moderate to firm pressure, apply the brakes to bring the vehicle to a stop. Do not allow the brakes to lock.
4. Repeat steps 2 and 3 until approximately 20 stops have been completed. Allow sufficient cooling periods between stops in order to properly burnish the brake pads and rotors.

FRONT BRAKE CALIPER REPLACEMENT

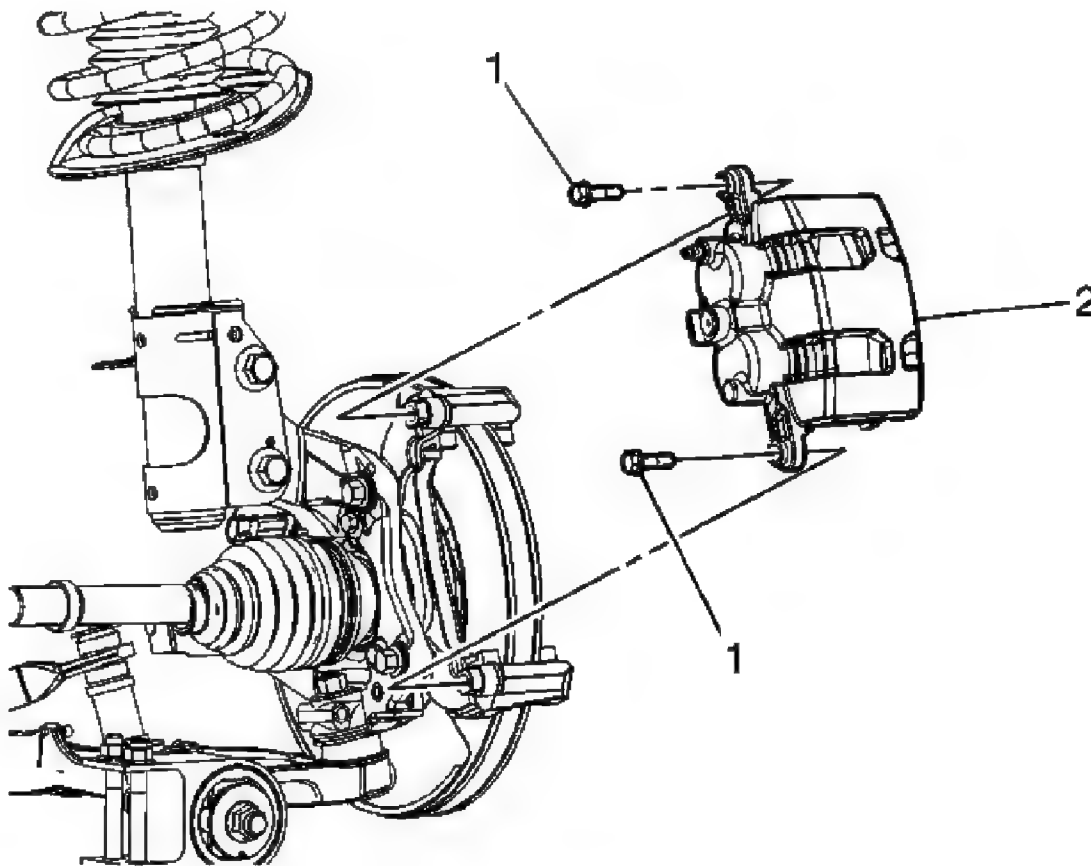


Fig. 16: Replacing Front Brake Caliper - (JL9)
 Courtesy of GENERAL MOTORS CORP.

Front Brake Caliper Replacement

Callout	Component Name
CAUTION: Refer to <u>Brake Fluid Irritant Caution</u> .	
CAUTION: Refer to <u>Brake Dust Caution</u> .	

NOTE:

Refer to Brake Fluid Effects on Paint and Electrical Components Notice .

Preliminary Procedures

1. Remove the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation .
2. Remove the brake hose from the brake caliper. Refer to Front Brake Hose Replacement .

1

Guide Pin Bolt. (Qty: 2)

NOTE:

Refer to Fastener Notice .

Tighten: 36 N.m (27 lb ft)

IMPORTANT:

Install an open end wrench to hold the caliper guide pin in line with the brake caliper while removing or installing the caliper guide pin bolt. **DO NOT** allow the open end wrench to come in contact with the brake caliper.

Tip: Hold the brake caliper guide pin bolt stationary when removing and installing the guide pin bolt.

2

Brake Caliper

Tip:

1. Cap or plug the brake hose to prevent the contamination of the brake system and fluid leaks.
2. **DO NOT** re-use the gaskets for the brake hose bolt. Use **NEW** gaskets only.
3. Bleed the brake system. Refer to Hydraulic Brake System Bleeding (Manual) or Hydraulic Brake System Bleeding (Pressure) .
4. With the engine OFF, gradually apply the brake pedal to approximately 2/3 of its travel distance.
5. Slowly release the brake pedal.
6. Wait 15 seconds, then repeat steps 4-5 until a firm brake pedal is obtained. This will properly seat the brake caliper pistons and brake pads.
7. Fill the master cylinder reservoir to the proper level. Refer to Master Cylinder Reservoir Filling .

REAR BRAKE CALIPER REPLACEMENT

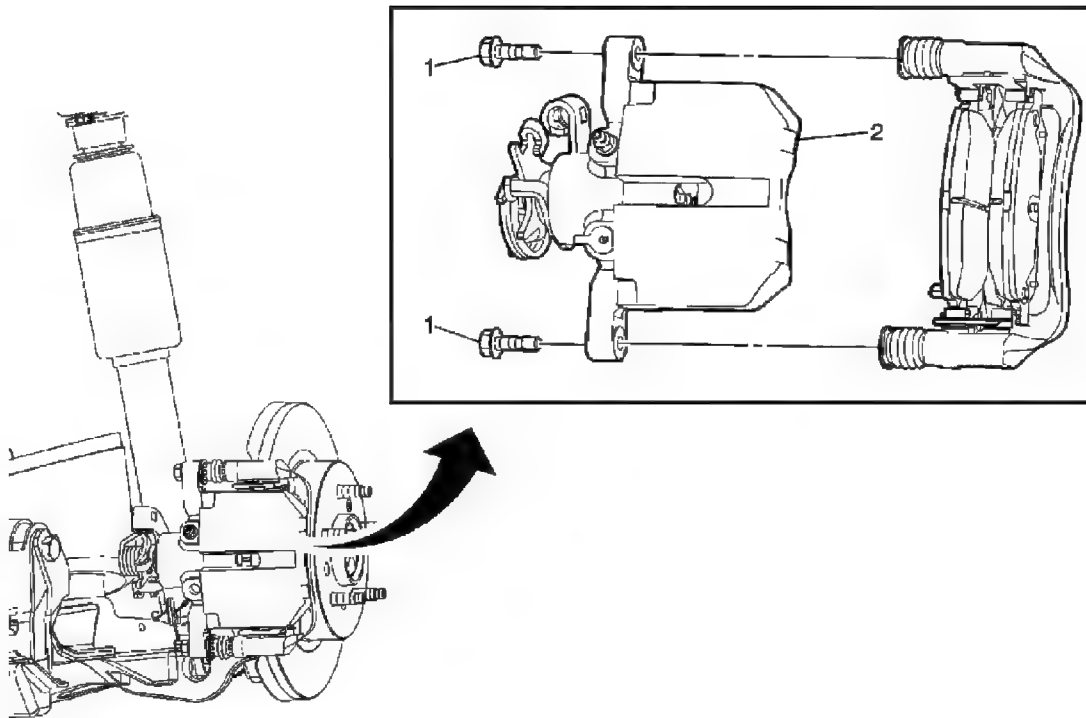


Fig. 17: Replacing Rear Brake Caliper
Courtesy of GENERAL MOTORS CORP.

Rear Brake Caliper Replacement

Callout	Component Name
<p>CAUTION: Refer to <u>Brake Dust Caution</u> .</p> <p>CAUTION: Refer to <u>Brake Fluid Irritant Caution</u> .</p> <p>NOTE: Refer to <u>Brake Fluid Effects on Paint and Electrical Components Notice</u> .</p>	
<p>Preliminary Procedure</p> <ol style="list-style-type: none"> 1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the tire and wheel. Refer to <u>Tire and Wheel Removal and Installation</u> . 3. Disconnect the park brake cable from the brake caliper. Refer to <u>Parking Brake Rear Cable Replacement - Left Side</u> or <u>Parking Brake Rear Cable Replacement - Right Side</u> . 	
	Guide Pin Bolt (Qty: 2)

2006 Buick Lucerne CXS

2006 BRAKES Disc Brakes - Lucerne

1	<p>NOTE: Refer to <u>Fastener Notice</u> .</p> <p>Tighten: 34 N.m (25 lb ft)</p>
2	<p>Brake Caliper</p> <p>Tip:</p> <ol style="list-style-type: none">1. DO NOT re-use the gaskets for the brake hose bolt. Use NEW gaskets only.2. Cap or plug the brake hose to prevent brake fluid loss or contamination.3. Bleed the brake system. Refer to <u>Hydraulic Brake System Bleeding (Manual)</u> or <u>Hydraulic Brake System Bleeding (Pressure)</u> .4. With the engine OFF, gradually apply the brake pedal to approximately 2/3 of its travel distance.5. Slowly release the brake pedal.6. Wait 15 seconds, then repeat steps 4-5 until a firm brake pedal is obtained. This will properly seat the brake caliper pistons and brake pads.7. Fill the master cylinder reservoir to the proper level. Refer to <u>Master Cylinder Reservoir Filling</u> .8. Burnish the pads and rotors. Refer to <u>Brake Pad and Rotor Burnishing</u>.

FRONT BRAKE CALIPER OVERHAUL

- **J 8092** Driver Handle. See Special Tools.
- **J 45863** Boot Seal Installer. See Special Tools.

CAUTION: Refer to Brake Fluid Irritant Caution .

Disassembly Procedure

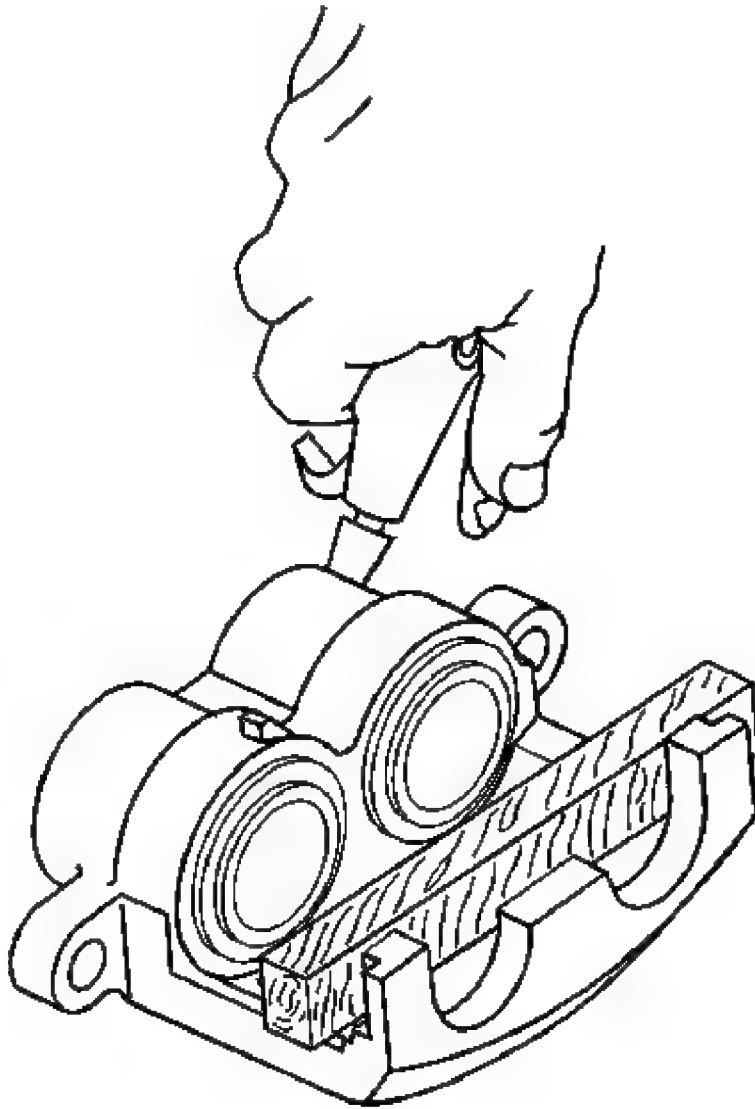


Fig. 18: Applying Air To Brake Caliper
Courtesy of GENERAL MOTORS CORP.

1. Drain all the brake fluid from the caliper.

CAUTION: Do not place your fingers in front of the piston in order to catch or protect the piston while applying compressed air. This could result in serious injury.

IMPORTANT: In the following service procedure, the caliper piston may become damage when it is removed from the brake caliper assembly. If this happens, DO NOT reuse the piston. Discard and replaced with new.

2. Install the brake caliper in a suitable holding devise.
3. Insert a piece of wood in the brake caliper.
4. Cover the brake caliper with a shop towel.
5. Using compressed filtered, non-lubricated air, apply the air to the remove the pistons from the brake caliper.

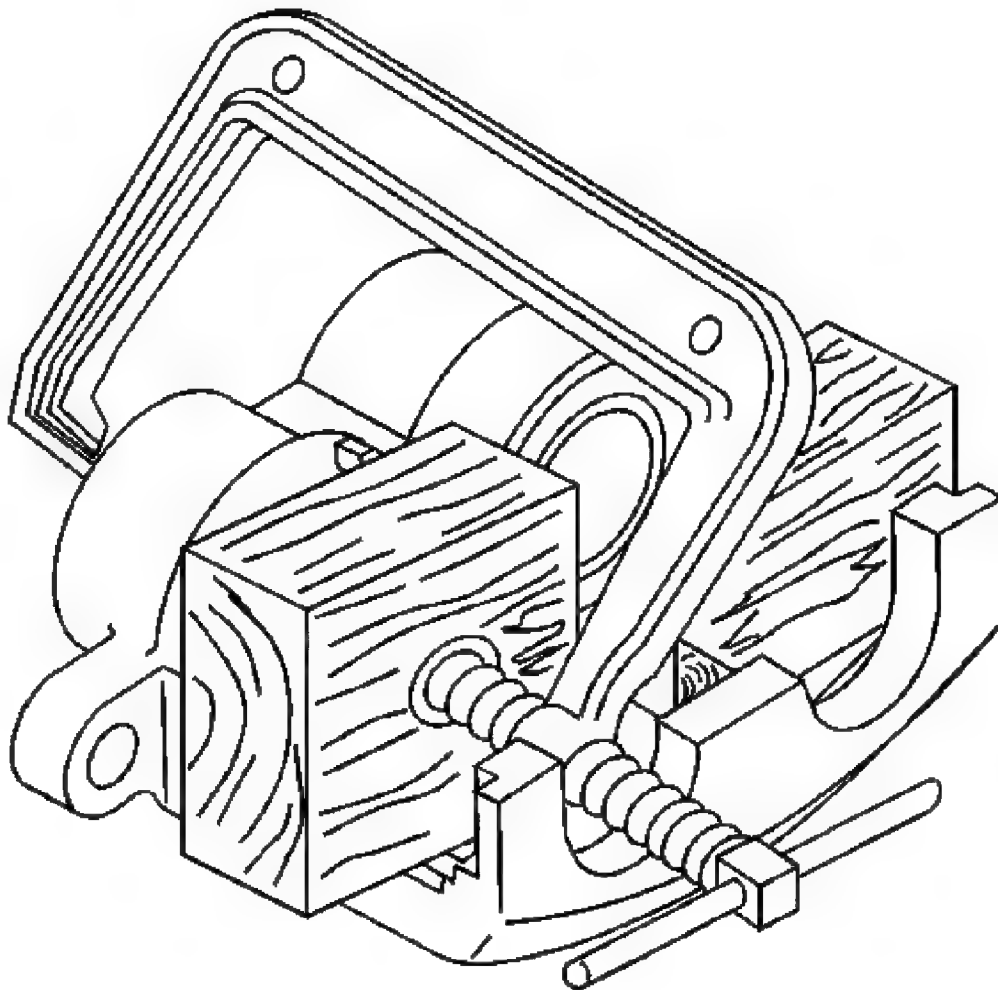


Fig. 19: Clamping Brake Caliper
Courtesy of GENERAL MOTORS CORP.

6. If one of the pistons fails to be removed from the brake caliper, perform the following steps.
 1. Reposition the piston that has been removed back in the brake caliper.
 2. Using a small block of wood and a C-clamp, slowly tighten the C-clamp until the piston it is half way in the brake caliper. It does not have to be fully seated.
 3. Position a second block of wood in front of the piston that remains in the brake caliper.
 4. Cover the brake caliper with a shop towel.
 5. Using compress filtered, non lubricated air, apply the air to the remove the pistons from the brake caliper.

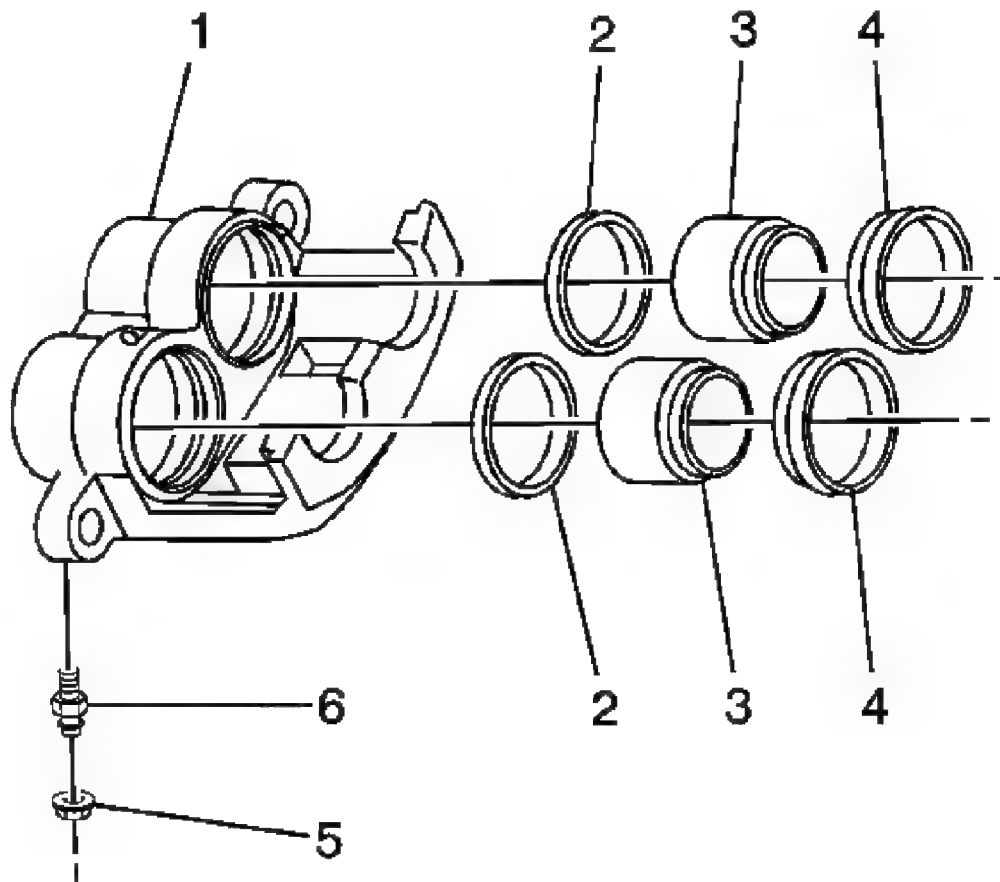


Fig. 20: Exploded View Of Brake Caliper
Courtesy of GENERAL MOTORS CORP.

7. Remove the pistons (3) from the caliper bores.

8. Remove the piston seals (2) from the caliper bores. Do not use a metal tool.
9. Remove the bleeder valve cap (5).
10. Remove the bleeder valve (6) from the caliper housing (1).
11. Clean the bleeder valve, the caliper bores, the caliper passages and the pistons with denatured alcohol. Dry the parts and blow out the brake fluid passages. Use dry and filtered compressed air.

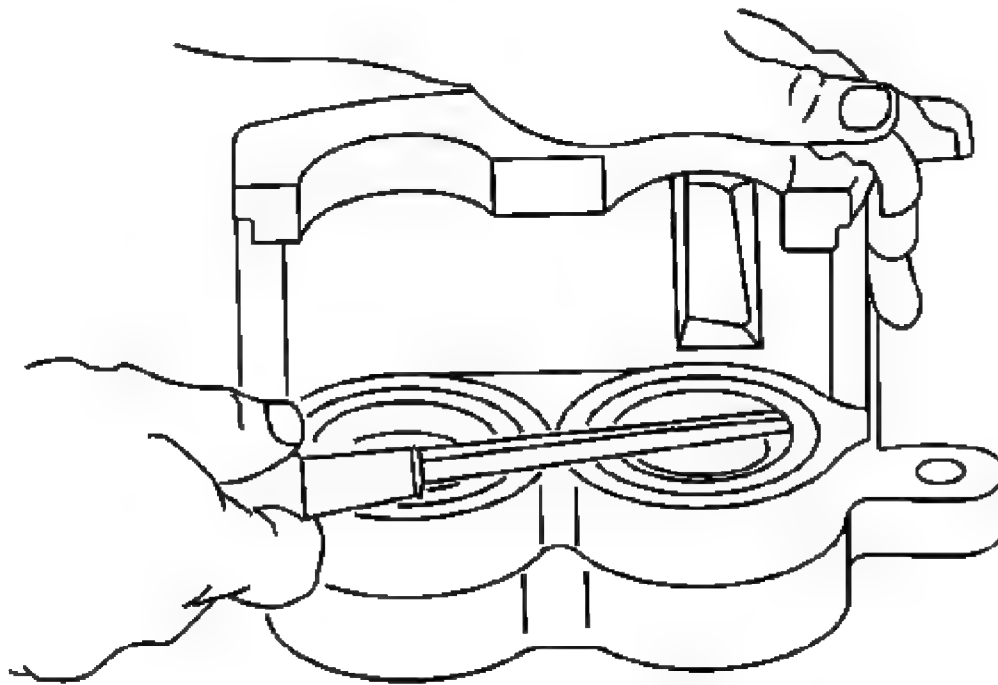


Fig. 21: Removing Caliper Boots
Courtesy of GENERAL MOTORS CORP.

12. Remove the boots from the caliper bores. Do not scratch the caliper bores.
13. Replace the pistons or the caliper if any of the following conditions exist:
 - Scoring in the caliper bores
 - Corrosion in the caliper bores
 - Pitting in the caliper bores
 - Damage to the pistons (phenolic)
14. Clean the brake caliper assembly with denatured alcohol.
15. Dry with filtered, lubricated compressed air.

Assembly Procedure

IMPORTANT: When applying the clean brake fluid to the piston bores and pistons, only apply the brake fluid to one bore at a time. This is done to ensure that the brake caliper, seals and pistons DO NOT become contaminated with dirt or other foreign material.

1. Apply a small amount of clean DOT-3 brake fluid to the piston, piston seal and piston bore.

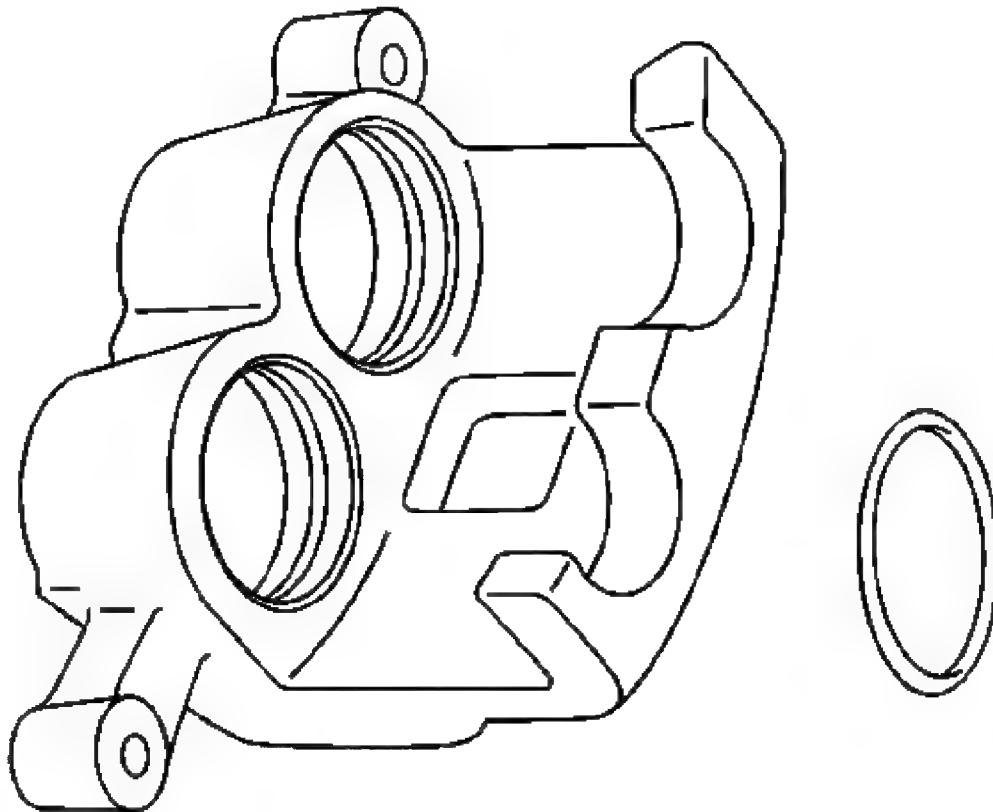


Fig. 22: View Of Brake Caliper Piston Seal
Courtesy of GENERAL MOTORS CORP.

2. Install the piston seal in the brake caliper.

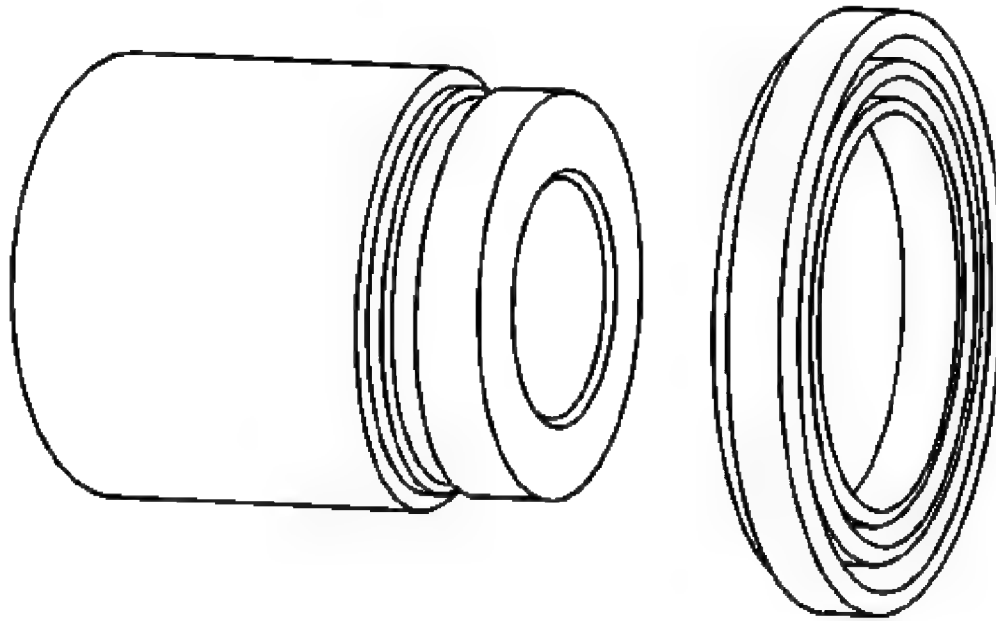


Fig. 23: View Of Piston Dust Seal
Courtesy of GENERAL MOTORS CORP.

3. Install the dust seal on the piston.

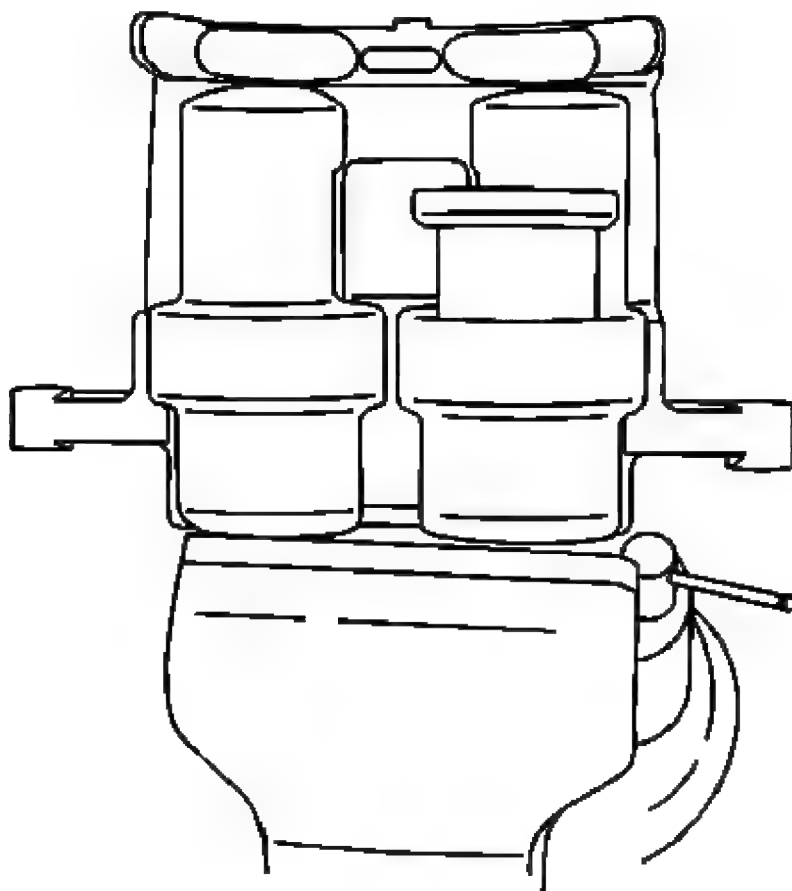


Fig. 24: Installing Piston To Brake Caliper
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: Position the piston in the bore so that it is straight and level.

4. Install the piston in the brake caliper.

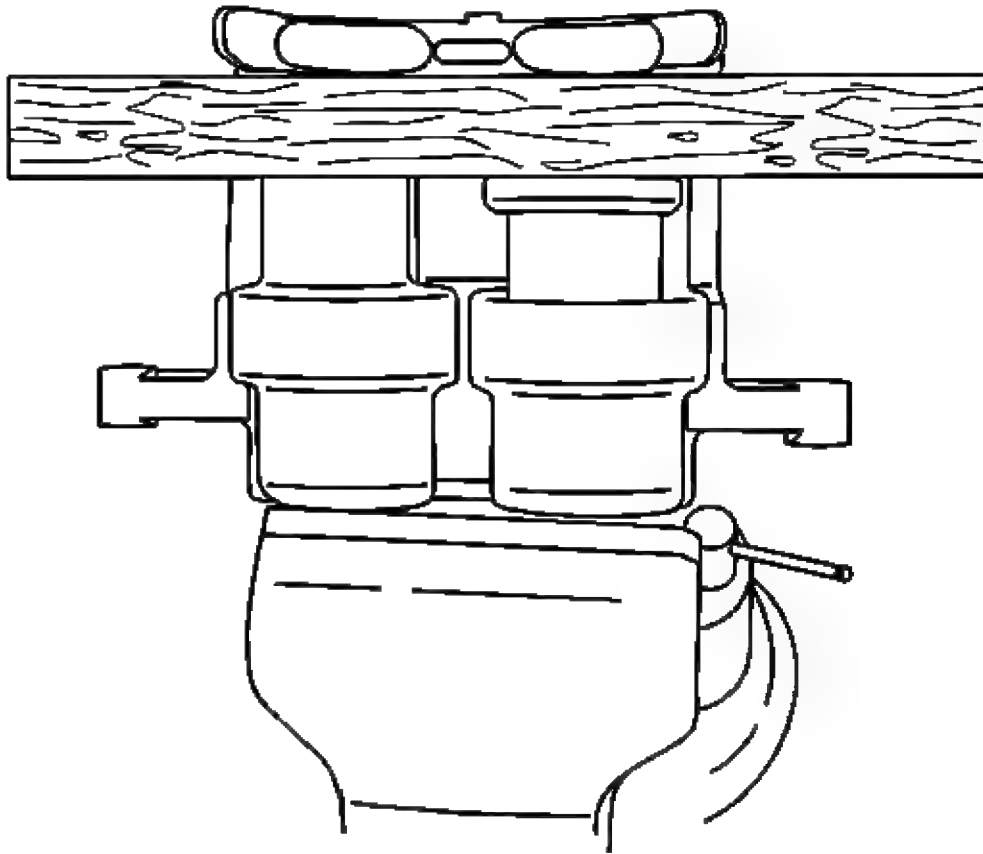


Fig. 25: Installing Piston Into Bore
Courtesy of GENERAL MOTORS CORP.

5. Position a piece of wood across the piston to be installed.
6. Applying equal pressure by hand while pushing down, install the piston in the bore.
7. Remove the piece of wood.

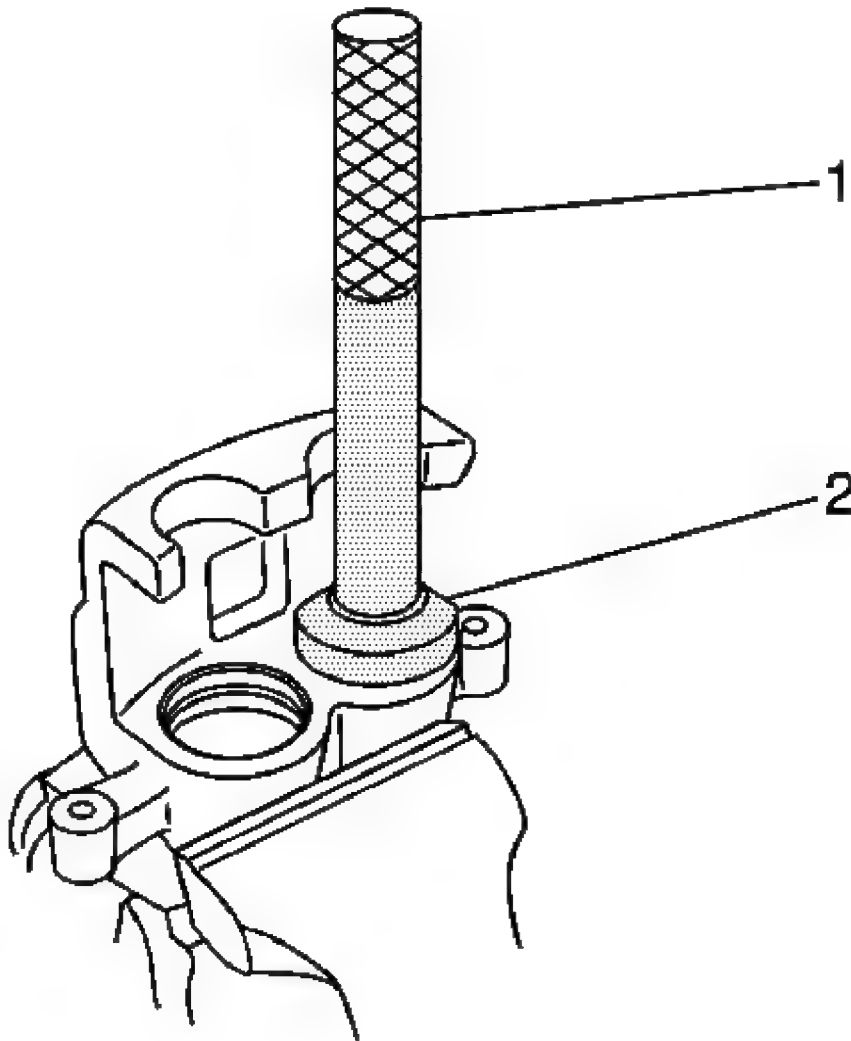


Fig. 26: Installing Piston Dust Seal
Courtesy of GENERAL MOTORS CORP.

8. Using the **J 8092** (1) and the **J 45863** (2), install the piston dust seal in the brake caliper. See **Special Tools**.

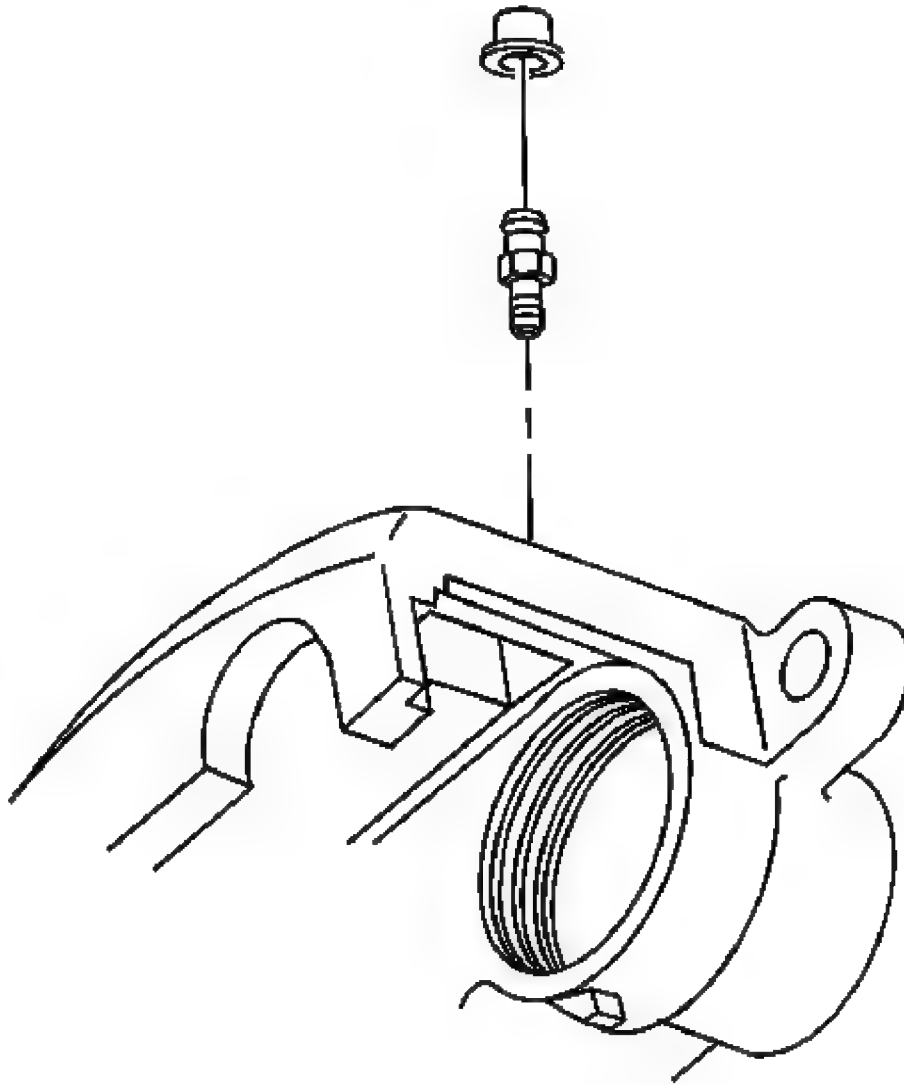


Fig. 27: View Of Bleeder Valve Cap
Courtesy of GENERAL MOTORS CORP.

NOTE: Refer to Fastener Notice .

9. Install the bleeder valve in the brake caliper housing.

Tighten: Tighten the bleeder valve to 13 N.m (115 lb in).

10. Install bleeder valve cap.

REAR BRAKE CALIPER OVERHAUL

Removal Procedure

CAUTION: Refer to Brake Dust Caution .

CAUTION: Refer to Brake Fluid Irritant Caution .

NOTE: Refer to Brake Fluid Effects on Paint and Electrical Components Notice .

1. Remove the rear brake caliper from vehicle. Refer to Rear Brake Caliper Replacement.

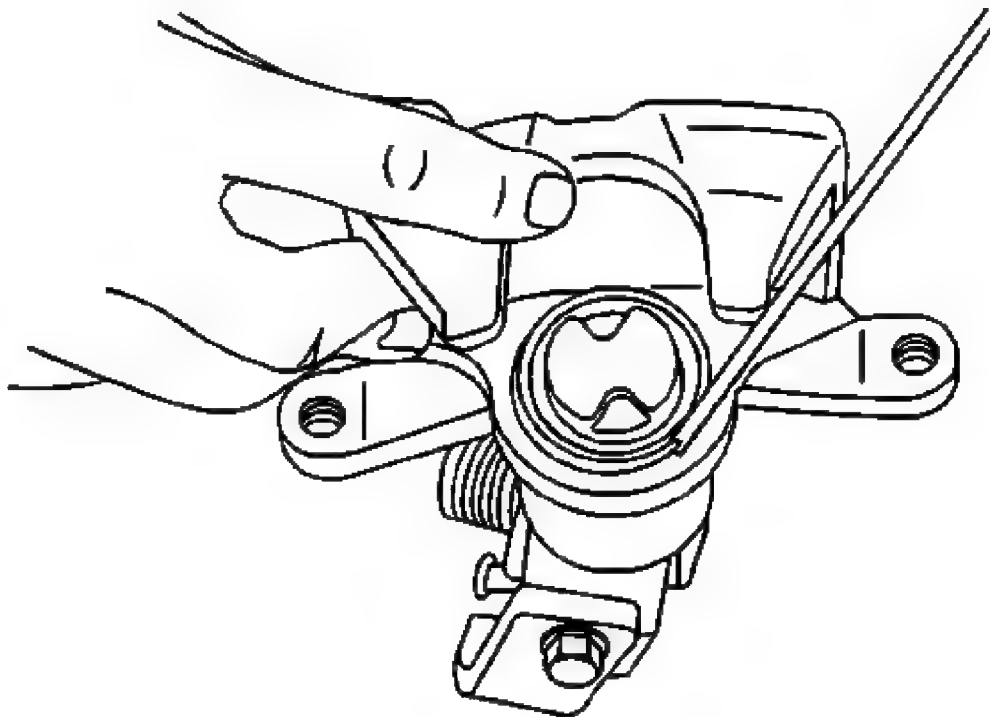


Fig. 28: View Of Rear Brake Caliper
Courtesy of GENERAL MOTORS CORP.

IMPORTANT: If the brake caliper was leaking brake fluid from the REAR of the caliper past the integral park brake actuator shaft seal, replace the brake caliper assembly. The park brake integral mechanism contains a non-serviceable seal which may be allowing brake fluid to leak past it and into the non-serviceable integral park brake mechanism.

2. Drain the brake fluid from the caliper assembly.
3. Using a small wooden or plastic tool, carefully remove the brake caliper piston dust boot seal retaining ring from the groove in the caliper seal counterbore.

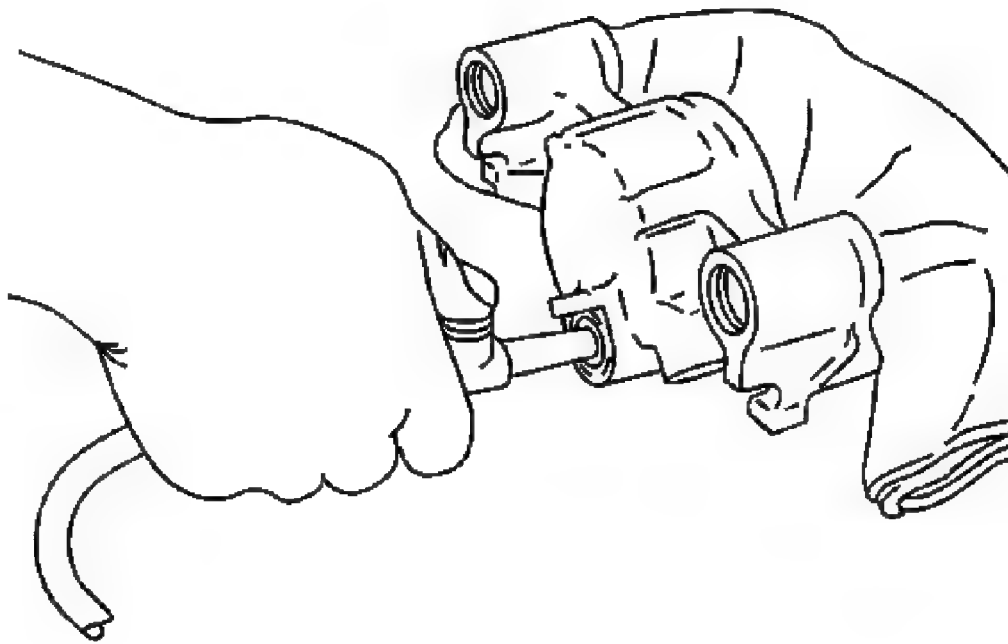


Fig. 29: Removing Brake Caliper Piston Using Low Pressure Compressed Air
Courtesy of GENERAL MOTORS CORP.

4. Place a block of wood against the inside of the caliper body, opposite of the caliper piston.
5. Direct low pressure compressed air through the caliper inlet hose to remove the caliper piston.

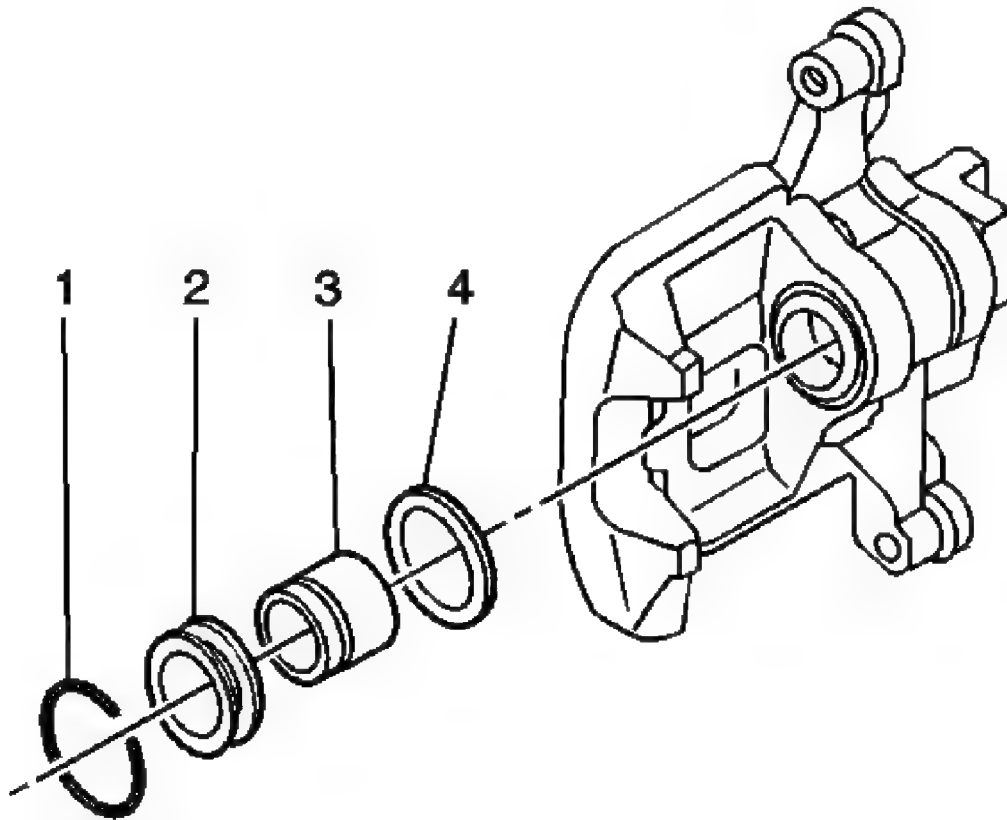


Fig. 30: Exploded View Of Brake Caliper
Courtesy of GENERAL MOTORS CORP.

6. Remove the piston dust boot seal (2) from the seal counterbore in the caliper and discard the dust boot seal.

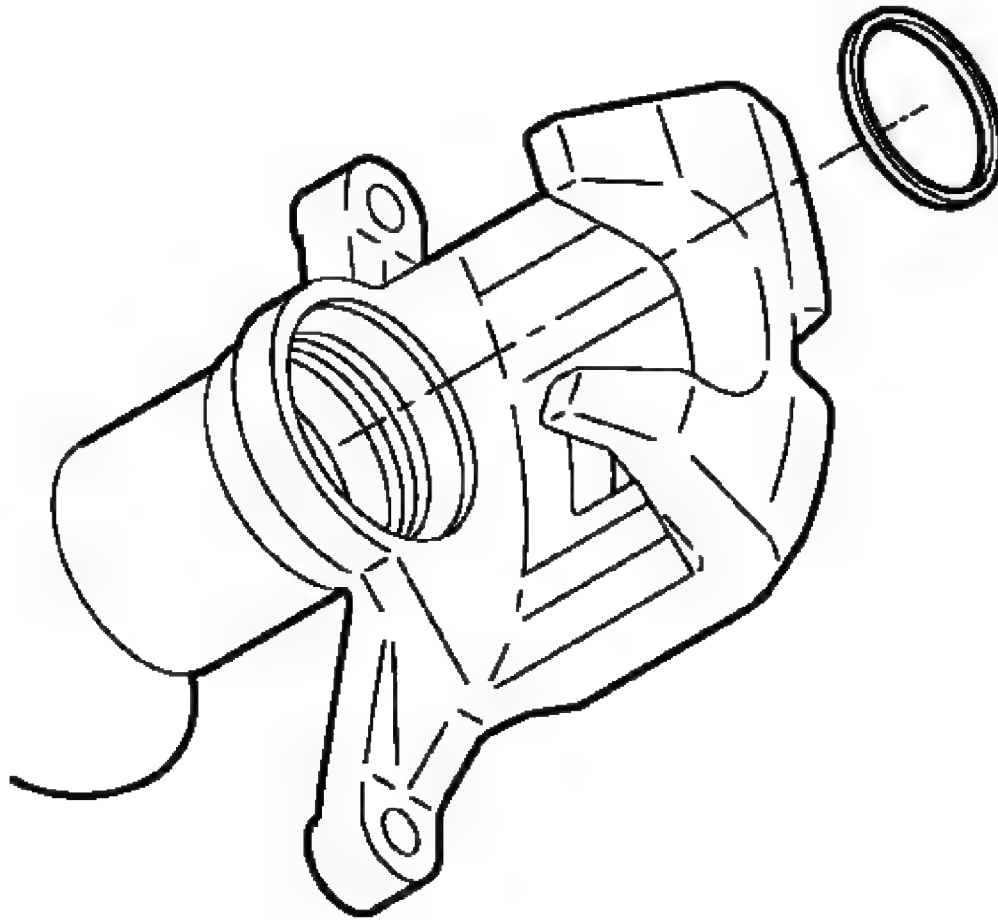


Fig. 31: View Of Piston Seal
Courtesy of GENERAL MOTORS CORP.

7. Using a small wooden or plastic tool, remove the piston seal from the caliper bore and discard the piston seal.
8. Inspect the operation of the integral park brake mechanism: Rotate the park brake lever back and forth while observing the movement of the park brake mechanism actuator assembly in the caliper bore.

IMPORTANT: The park brake lever, lever return spring and actuator shaft seal are not serviceable components of the integral park brake mechanism. Do not disassemble the integral park brake mechanism.

9. If the integral park brake mechanism was not operating properly, binding or seized,

replace the brake caliper assembly.

IMPORTANT: Do not use abrasives to clean the brake caliper piston.

10. If cracks, scoring, pitting, excessive rust, and/or excessive corrosion are present in the caliper bore, replace the caliper assembly.
11. If light rust or light corrosion are present in the caliper bore, attempt to remove the imperfection with a fine emery paper. If the imperfection cannot be removed, replace the caliper assembly.
12. Clean the brake caliper piston bore and seal counterbore, the caliper piston and the caliper sleeves with denatured alcohol or equivalent.
13. Clean the brake caliper piston bore and seal counterbore, the caliper piston and the caliper sleeves with denatured alcohol or equivalent.
14. Dry the caliper piston bore and counterbore, the piston and the sleeves with non-lubricated, filtered air.
15. Inspect the caliper piston for cracks, scoring, damage to the chrome plating, and/or damage to the integral adjusting mechanism. Replace the caliper piston if any of these conditions exist.
16. Inspect the caliper mounting holes for cracks, scoring, pitting, rust, and/or excessive corrosion. Replace the caliper assembly if any of these conditions exist.

Installation Procedure

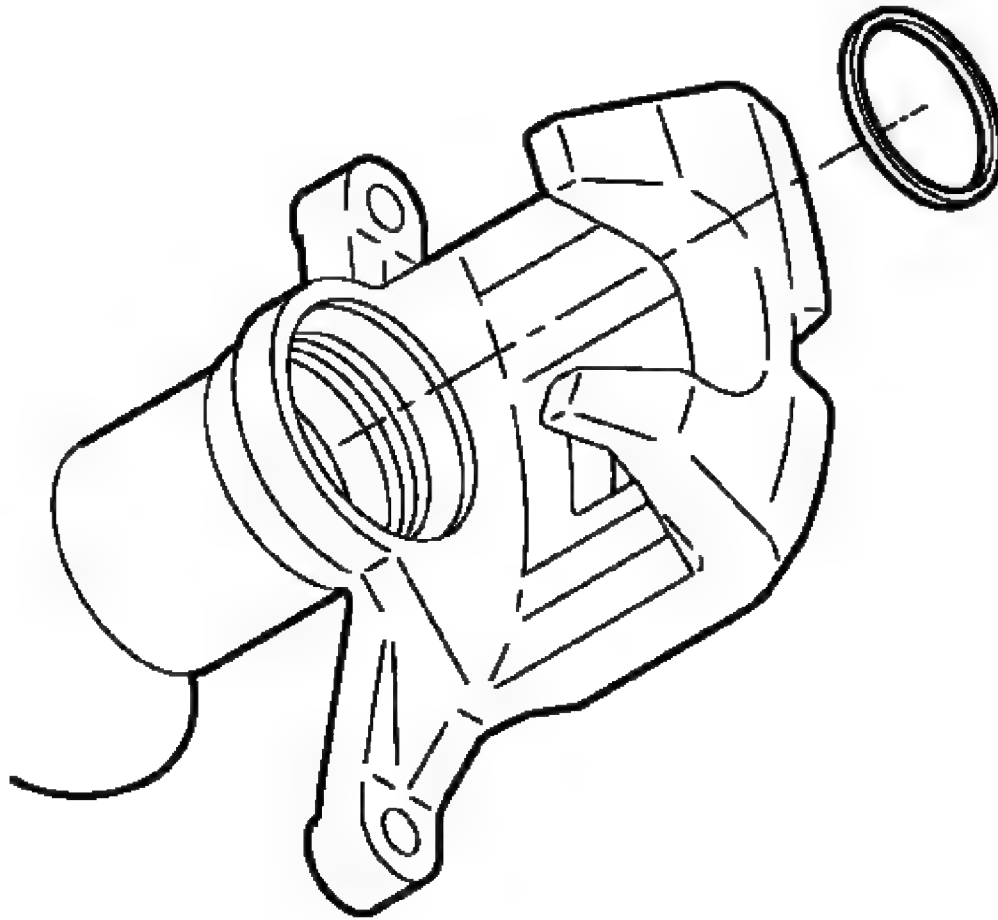


Fig. 32: View Of Piston Seal
Courtesy of GENERAL MOTORS CORP.

1. Lubricate the new piston seal with GM approved or equivalent DOT-3 brake fluid from a clean, sealed brake fluid container.
2. Install the lubricated, new piston seal into the caliper bore.

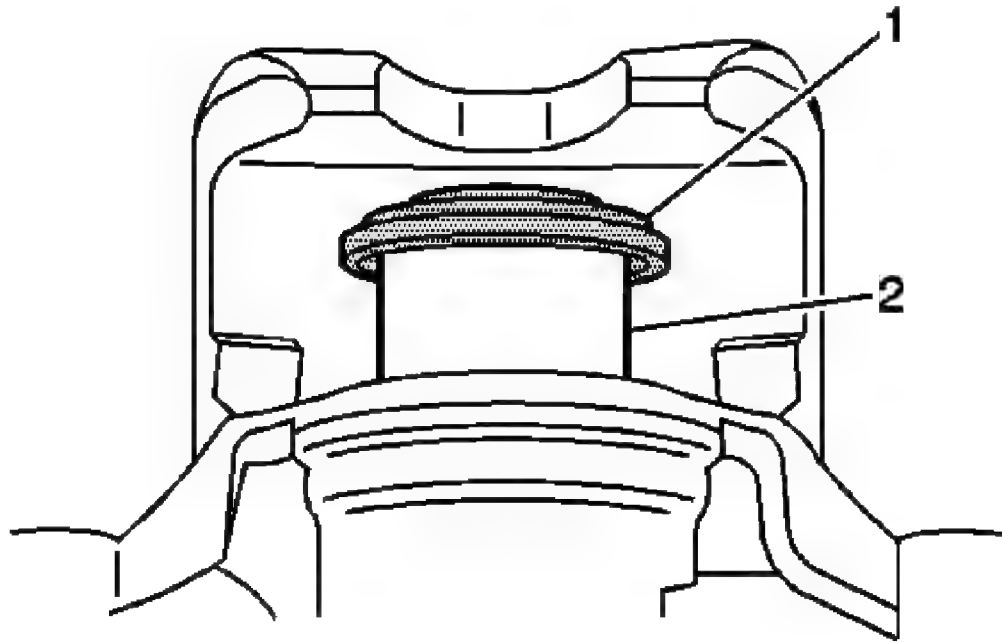


Fig. 33: Identifying Caliper Piston & Piston Dust Boot Seal
Courtesy of GENERAL MOTORS CORP.

3. Install the new dust boot seal onto the caliper piston (2).

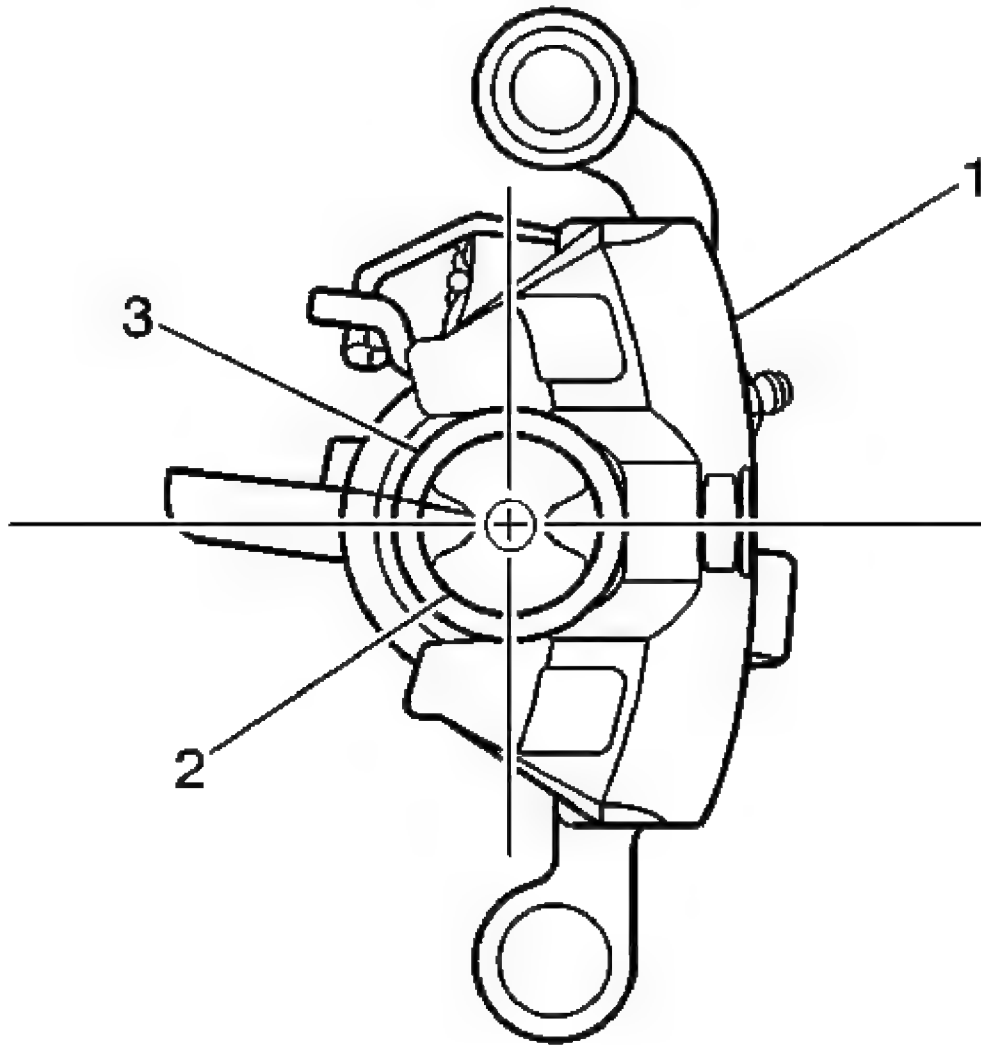


Fig. 34: Rotating Piston In Caliper Body
Courtesy of GENERAL MOTORS CORP.

4. Insert the caliper piston into the caliper bore. Using a spanner type wrench, rotate the piston (2) clockwise to fully seat the piston into the caliper body (1).

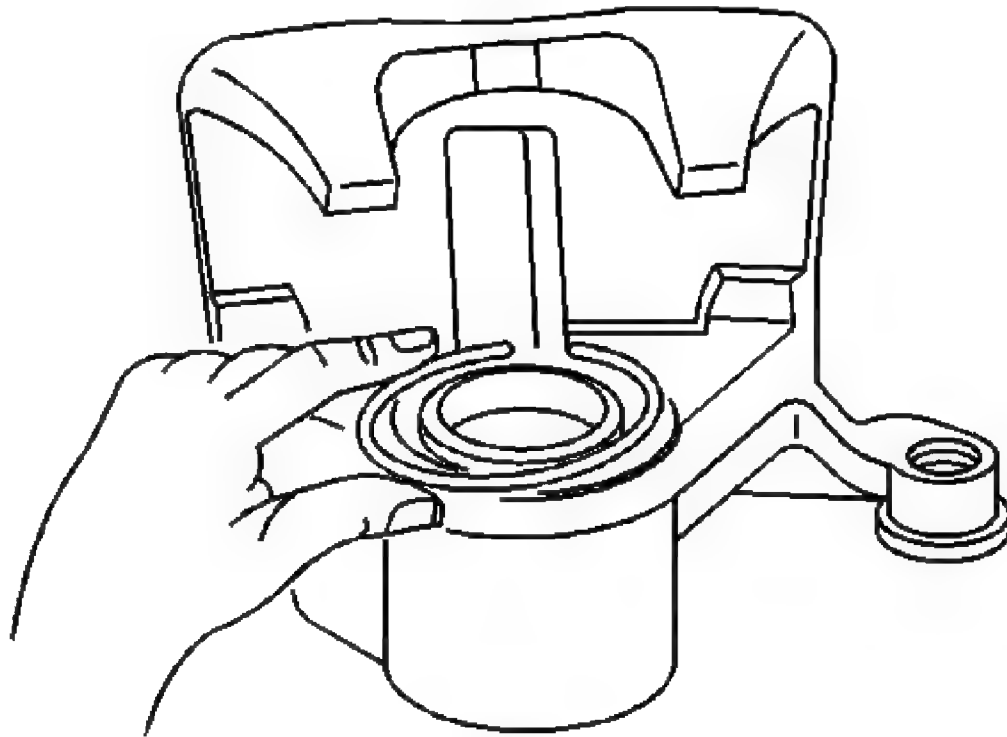


Fig. 35: View Of Dust Boot Retaining Ring
Courtesy of GENERAL MOTORS CORP.

5. Fully seat the piston dust boot seal in the seal counterbore.
6. Install the piston dust boot seal retaining ring to the groove in the caliper seal counterbore.
7. Install the brake caliper to the vehicle. Refer to **Rear Brake Caliper Replacement**.

Inspect the brake caliper for brake fluid leaks while performing the hydraulic brake system bleeding procedure after the caliper has been installed to the vehicle. If the brake caliper leaks brake fluid from the FRONT of the caliper past the piston dust boot seal, replace the caliper piston assembly. The piston integral adjustment mechanism contains a non-serviceable seal which may be allowing brake fluid to leak past it through a bleed hole near the end of the caliper piston.

FRONT DISC BRAKE HARDWARE REPLACEMENT

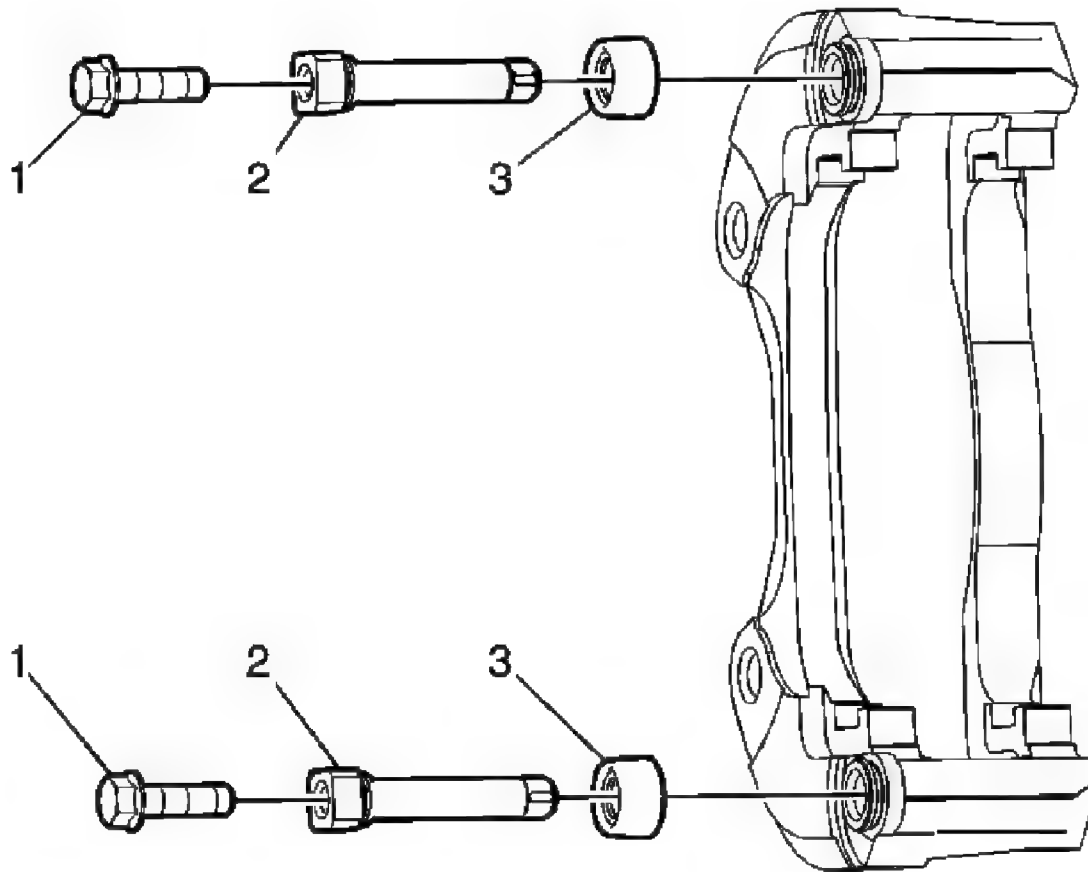


Fig. 36: Replacing Front Disc Brake Hardware - (JL9)
 Courtesy of GENERAL MOTORS CORP.

Front Disc Brake Hardware Replacement

Callout	Component Name
CAUTION: Refer to <u>Brake Dust Caution</u> .	
NOTE: Support the brake caliper with heavy mechanic wire or equivalent, whenever it is separated from its mount and the hydraulic flexible brake hose is still connected. Failure to support the caliper in this manner will cause the flexible brake hose to bear the weight of the caliper, which may cause damage to the brake hose and in turn may cause a brake fluid leak.	
Preliminary Procedures	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the tire and wheel. Refer to <u>Tire and Wheel Removal and Installation</u> .	
	Guide Pin Bolt (Qty: 2) NOTE:

2006 Buick Lucerne CXS

2006 BRAKES Disc Brakes - Lucerne

1	<p>Refer to <u>Fastener Notice</u> .</p> <p>Tighten: 36 N.m (27 lb ft)</p> <p>IMPORTANT: Install an open end wrench to hold the caliper guide pin in line with the brake caliper while removing or installing the caliper guide pin bolt. DO NOT allow the open end wrench to come in contact with the brake caliper.</p> <p>Tip:</p> <ul style="list-style-type: none">• Hold the guide pin stationary when removing or installing the guide pin bolt.• Remove the brake caliper from the caliper bracket and support with heavy mechanics wire or equivalent.
2	<p>Guide Pin (Qty: 2)</p> <p>Tip: Apply a small amount of high temperature silicone grease to the guide pins and in the bore for the guide pins.</p>
3	<p>Guide Pin Seal (Qty: 2)</p> <p>Tip: Ensure the lip of the seal is fully seated in the groove of the guide pin.</p>

REAR DISC BRAKE HARDWARE REPLACEMENT

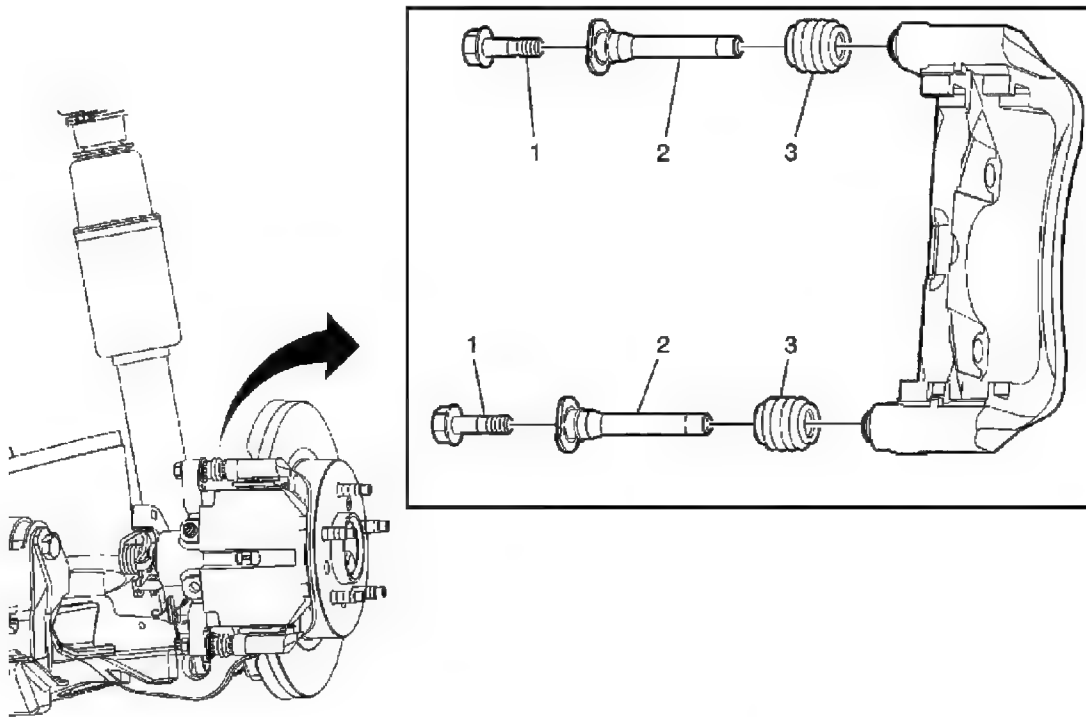


Fig. 37: Replacing Rear Disc Brake Hardware - (JL9)
 Courtesy of GENERAL MOTORS CORP.

Rear Disc Brake Hardware Replacement

Callout	Component Name
CAUTION: Refer to <u>Brake Dust Caution</u> .	
NOTE: Support the brake caliper with heavy mechanic wire or equivalent, whenever it is separated from its mount and the hydraulic flexible brake hose is still connected. Failure to support the caliper in this manner will cause the flexible brake hose to bear the weight of the caliper, which may cause damage to the brake hose and in turn may cause a brake fluid leak.	
Preliminary Procedures	
1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the tire and wheel. Refer to <u>Tire and Wheel Removal and Installation</u> .	
	Guide Pin Bolt (Qty: 2) NOTE: Refer to <u>Fastener Notice</u> . Tighten: 34 N.m (25 lb ft)

2006 Buick Lucerne CXS

2006 BRAKES Disc Brakes - Lucerne

1	<p>IMPORTANT: Install an open end wrench to hold the caliper guide pin in line with the caliper while removing or installing the caliper guide pin bolt. DO NOT allow the open end wrench to come in contact with the brake caliper.</p> <p>Tip:</p> <ul style="list-style-type: none">• Hold the guide pin stationary when removing or installing the guide pin bolt.• Remove the brake caliper from the caliper bracket and support with heavy mechanics wire or equivalent.
2	<p>Guide Pin (Qty: 2)</p> <p>Tip: Apply a small amount of high temperature silicone brake lubricate to the inside of the guide pin seal.</p>
3	<p>Guide Pin Seal</p> <p>Tip: Ensure the lip of the seal is fully seated in the groove of the guide pin.</p>

FRONT BRAKE CALIPER BRACKET REPLACEMENT

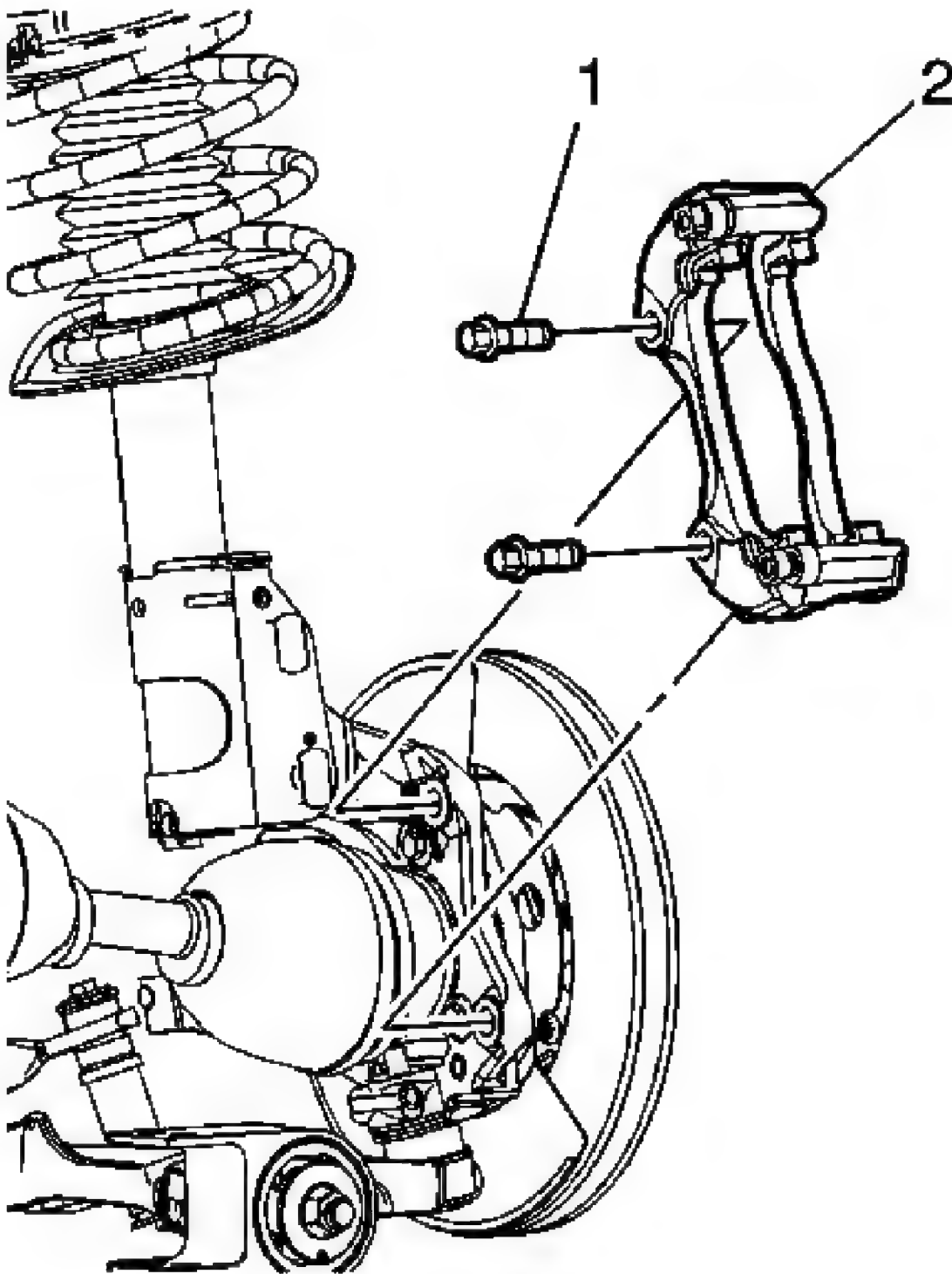


Fig. 38: Brake Caliper Bracket And Mounting Bolts
 Courtesy of GENERAL MOTORS CORP.

Front Brake Caliper Bracket Replacement

Callout	Component Name
CAUTION:	

Refer to **Brake Dust Caution** .

NOTE:

Refer to **Fastener Notice** .

NOTE:

Support the brake caliper with heavy mechanic wire or equivalent, whenever it is separated from its mount and the hydraulic flexible brake hose is still connected. Failure to support the caliper in this manner will cause the flexible brake hose to bear the weight of the caliper, which may cause damage to the brake hose and in turn may cause a brake fluid leak.

Fastener Tightening Specifications: Refer to **Fastener Tightening Specifications**.

Preliminary Procedure

1. Remove the tire and wheel. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the brake caliper and support with heavy mechanics wire or equivalent. DO NOT disconnect the brake flexible hose from the caliper. Refer to **Front Brake Caliper Replacement**.
3. Remove the brake pads. Refer to **Front Disc Brake Pads Replacement**.

1	<p>Front Brake Caliper Bracket Bolt (Qty: 2)</p> <p>Tip:</p> <ol style="list-style-type: none"> 1. Ensure that the threaded holes in the mounting bracket are clean and free of debris. 2. Prepare the bolts and the threaded holes for assembly. <ul style="list-style-type: none"> • Thoroughly clean the residue from the fastener threads using denatured alcohol or equivalent and allow to dry. • Thoroughly clean the residue from the threaded holes using denatured alcohol or equivalent and allow to dry. • If reusing the caliper bracket bolts, apply threadlocker GM P/N 12345493 (Canadian P/N 10953488) or equivalent to 2/3 of the threaded length of the fastener. Ensure there are no gaps in the threadlocker along the length of the filled area of the fastener. 3. Allow the threadlocker to cure approximately 10 minutes before installation. <p>Tighten: 180 N.m (133 lb ft)</p>
2	Brake Caliper Mounting Bracket

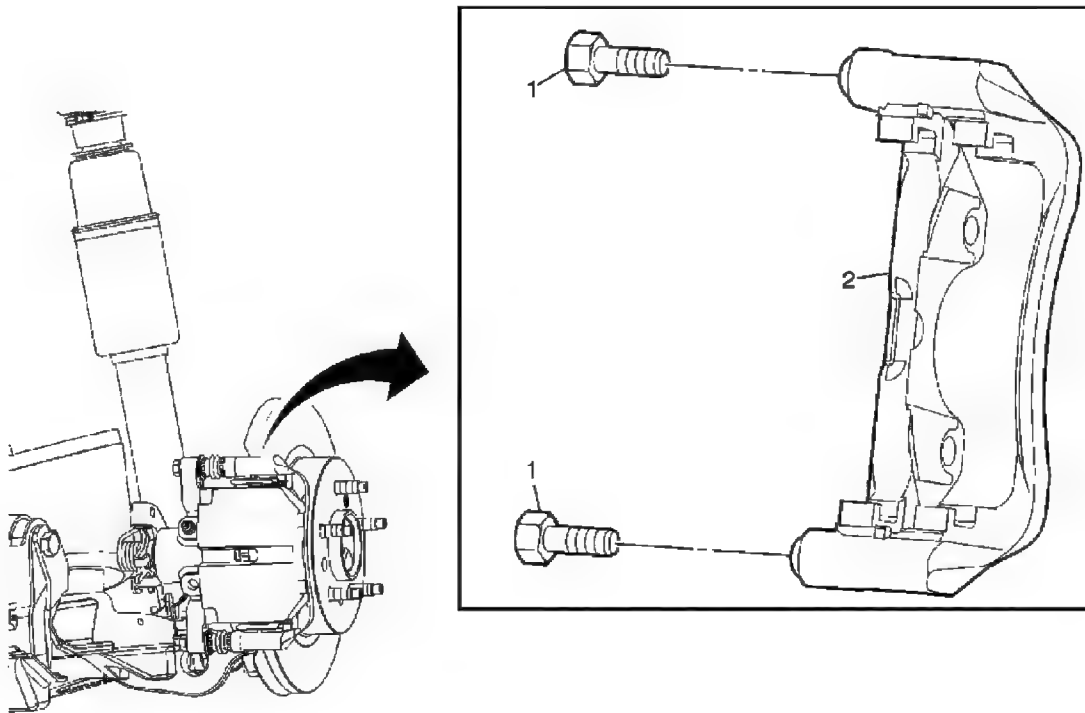


Fig. 39: Replacing Rear Brake Caliper Bracket
Courtesy of GENERAL MOTORS CORP.

Rear Brake Caliper Bracket Replacement

Callout	Component Name
<p>CAUTION: Refer to <u>Brake Dust Caution</u> .</p> <p>NOTE: Refer to <u>Fastener Notice</u> .</p> <p>NOTE: Support the brake caliper with heavy mechanic wire or equivalent, whenever it is separated from its mount and the hydraulic flexible brake hose is still connected. Failure to support the caliper in this manner will cause the flexible brake hose to bear the weight of the caliper, which may cause damage to the brake hose and in turn may cause a brake fluid leak.</p> <p>Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>. Preliminary Procedure: Remove the brake pads. Refer to <u>Rear Disc Brake Pads Replacement</u>.</p>	
	<p>Bracket Bolts (Qty: 2)</p> <p>Tip:</p> <ol style="list-style-type: none"> 1. Prepare the bolts and the threaded holes for assembly.

1	<ul style="list-style-type: none"> • Thoroughly clean the residue from the fastener threads using denatured alcohol or equivalent and allow to dry. • Thoroughly clean the residue from the threaded holes using denatured alcohol or equivalent and allow to dry. • If reusing the caliper bracket bolts, apply threadlocker GM P/N 12345493 (Canadian P/N 10953488) or equivalent to 2/3 of the threaded length of the fastener. Ensure there are no gaps in the threadlocker along the length of the filled area of the fastener. <p>2. Allow the threadlocker to cure approximately 10 minutes before installation.</p> <p>Tighten: 128 N.m (94 lb ft)</p>
2	Caliper Bracket

FRONT BRAKE ROTOR REPLACEMENT

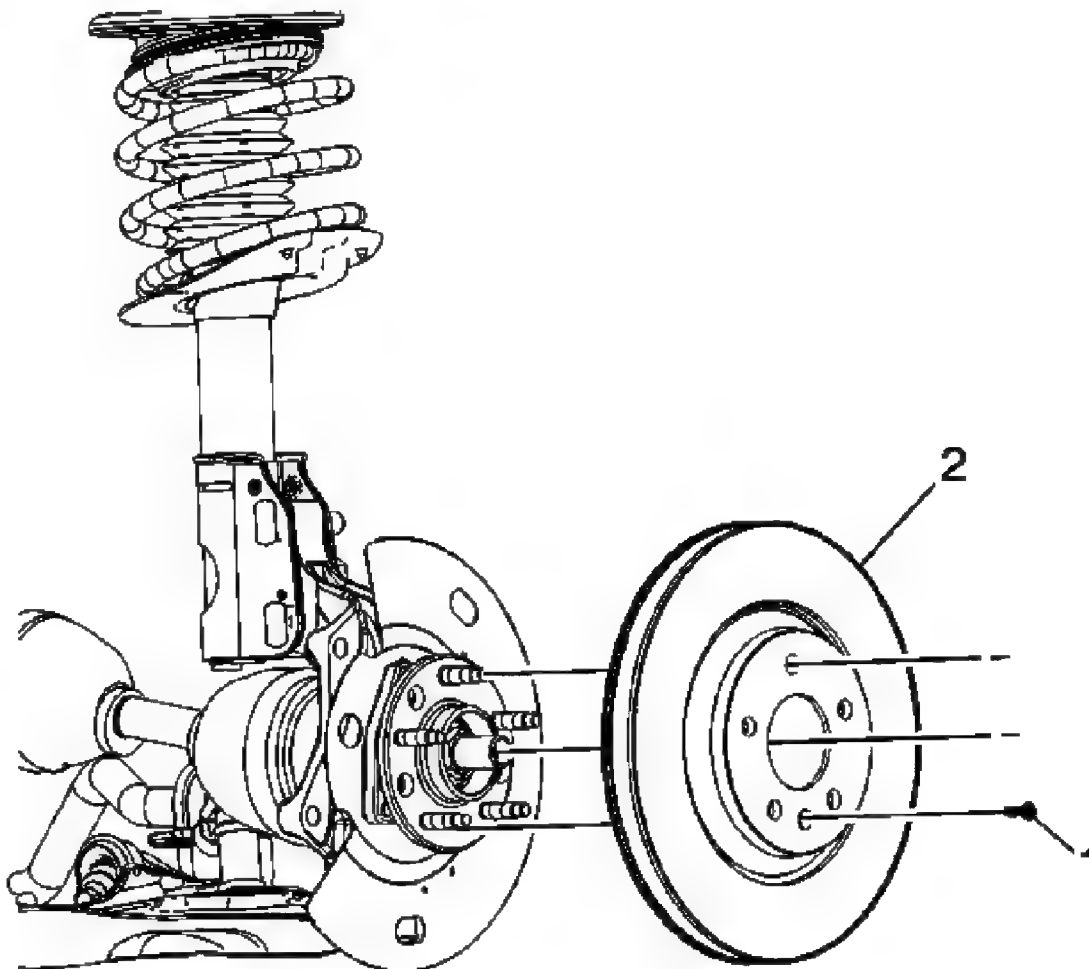


Fig. 40: Replacing Front Brake Rotor

Courtesy of **GENERAL MOTORS CORP.**

Front Brake Rotor Replacement

Callout	Component Name
CAUTION: Refer to <u>Brake Dust Caution</u> .	
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> . Preliminary Procedure: Remove the brake caliper mounting bracket. Refer to <u>Front Brake Caliper Bracket Replacement</u> .	
1	Mounting Screw Tighten: 12 N.m (106 lb ft)
2	Brake Rotor Tip: <ol style="list-style-type: none"> 1. If removing the brake rotor to service the brake system, mark the relationship of the rotor to a wheel stud, before removing the mounting screw. 2. Using the J 42450-A , thoroughly clean any rust or corrosion from the mating surface of the hub/axle flange. See <u>Special Tools</u>. 3. Using the J 41013 , thoroughly clean any rust or corrosion from the mounting surface of the brake rotor to the wheel bearing/hub. See <u>Special Tools</u>. 4. After installing the brake rotor, check for assembled lateral runout (LRO). Refer to <u>Brake Rotor Assembled Lateral Runout Correction</u>. 5. If the assembled lateral runout (LRO) exceeds specifications, refer to <u>Brake Rotor Assembled Lateral Runout Correction - Indexing</u>. 6. If the brake rotor was refinished or replaced, burnish the pads and rotors. Refer to <u>Brake Pad and Rotor Burnishing</u>.

REAR BRAKE ROTOR REPLACEMENT

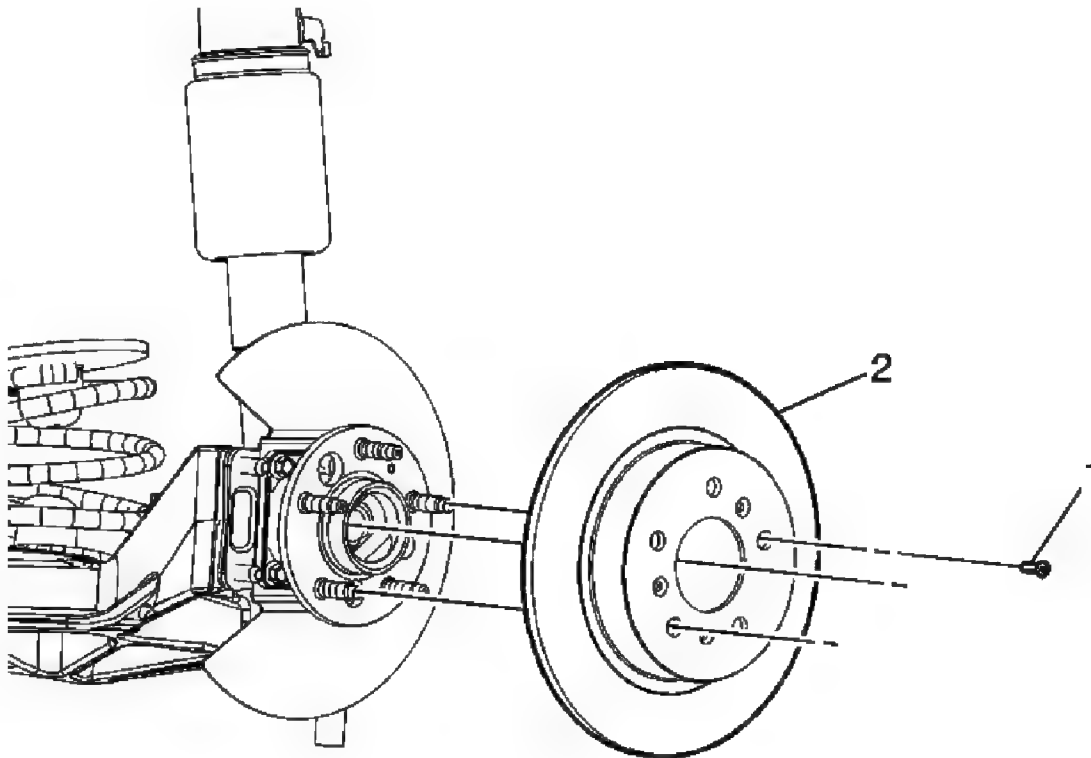


Fig. 41: Replacing Rear Brake Rotor
Courtesy of GENERAL MOTORS CORP.

Rear Brake Rotor Replacement

Callout	Component Name
CAUTION: Refer to <u>Brake Dust Caution</u> .	
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> . Preliminary Procedure: Remove the brake caliper mounting bracket. Refer to <u>Rear Brake Caliper Bracket Replacement</u> .	
1	Rotor Retention Bolt Tighten: 12 N.m (106 lb in)
	Brake Rotor Tip: <ol style="list-style-type: none"> 1. If removing the rotor to service the wheel bearing/hub, use the J 41013 , to clean the contact area of the rotor to the wheel bearing/hub. See Special Tools.

2

2. If servicing the rotor, use the **J 42450-A** , to clean the contact area of the wheel bearing/hub. See **Special Tools**.
3. If the brake rotor was removed and installed measure the lateral runout measurement (LRO). Refer to **Brake Rotor Assembled Lateral Runout Measurement**.
4. If the LRO measurement exceeds specifications, refer to **Brake Rotor Assembled Lateral Runout Correction**.
5. Burnish the pads and rotors. Refer to **Brake Pad and Rotor Burnishing**.

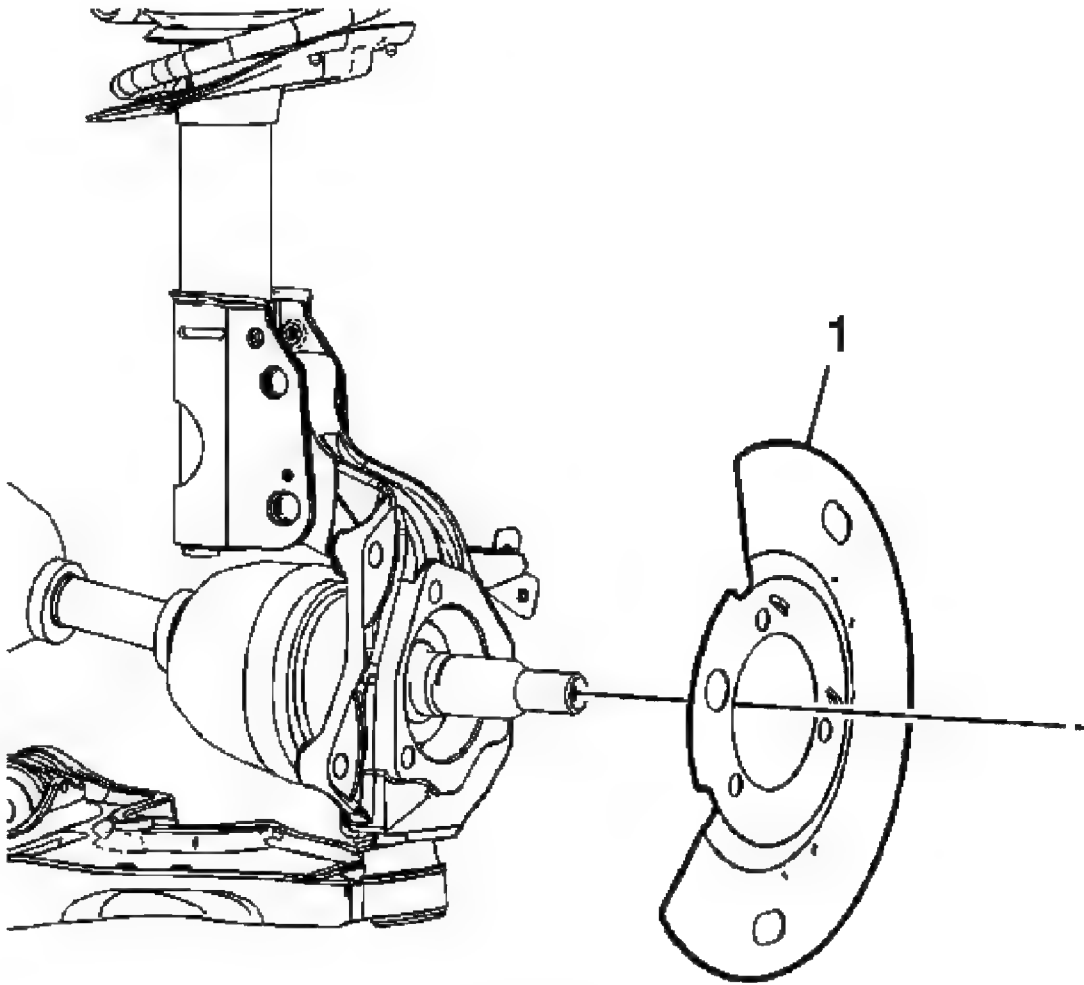
FRONT BRAKE SHIELD REPLACEMENT

Fig. 42: Replacing Front Brake Shield
Courtesy of GENERAL MOTORS CORP.

Front Brake Shield Replacement

2006 Buick Lucerne CXS

2006 BRAKES Disc Brakes - Lucerne

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
Preliminary Procedures	
<ol style="list-style-type: none">1. Raise and support the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> .2. Remove the tire and wheel. Refer to <u>Tire and Wheel Removal and Installation</u> .3. Remove the wheel bearing/hub assembly. Refer to <u>Front Wheel Bearing and Hub Replacement</u> .	
1	Disc Brake Splash Shield

REAR DISC BRAKE BACKING PLATE REPLACEMENT

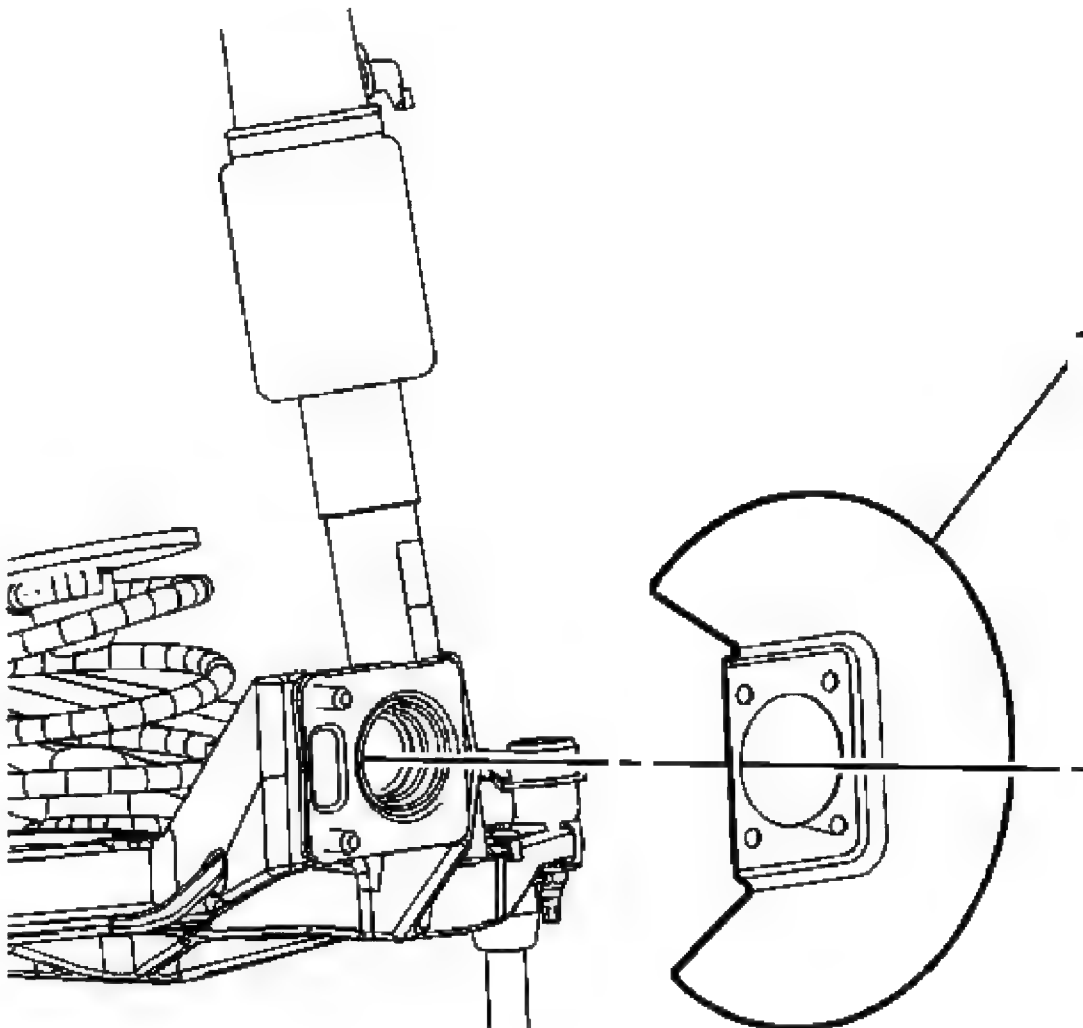


Fig. 43: Replacing Rear Disc Brake Backing Plate
Courtesy of GENERAL MOTORS CORP.

Rear Disc Brake Backing Plate Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
Preliminary Procedure	
1. Raise the vehicle. Refer to <u>Lifting and Jacking the Vehicle</u> . 2. Remove the tire and wheel. Refer to <u>Tire and Wheel Removal and Installation</u> . 3. Remove the wheel bearing/hub assembly. Refer to <u>Rear Wheel Bearing and Hub Replacement</u> .	
1	Rear Splash Shield

BRAKE ROTOR ASSEMBLED LATERAL RUNOUT CORRECTION

- IMPORTANT:**
- Brake rotor thickness variation **MUST** be checked **BEFORE** checking for assembled lateral runout (LRO). Thickness variation exceeding the maximum acceptable level can cause brake pulsation. Refer to Brake Rotor Thickness Variation Measurement.
 - Brake rotor assembled lateral runout (LRO) exceeding the maximum allowable specification can cause thickness variation to develop in the brake rotor over time, usually between 4 800-11 300 km (3,000-7,000 mi). Refer to Brake Rotor Assembled Lateral Runout Measurement.

Review the following acceptable methods for bringing the brake rotor assembled LRO to within specifications. Determine which method to use for the specific vehicle being repaired.

- The indexing method of correcting assembled LRO is most effective when the LRO specification is only exceeded by a relatively small amount: 0.025-0.127 mm (0.001-0.005 in). Indexing is used to achieve the best possible match of high spots to low spots between related components. Refer to Brake Rotor Assembled Lateral Runout Correction - Indexing.
- The correction plate method of correcting assembled LRO involves the addition of a tapered plate between the brake rotor and the hub/axle flange. The correction plate method can be used to correct LRO that exceeds the specification by up to 0.23 mm

(0.009 in). Refer to **Brake Rotor Assembled Lateral Runout Correction - Correction Plates**.

- The on-vehicle brake lathe method is used to bring the LRO to within specifications through compensating for LRO while refinishing the brake rotor. Refer to **Brake Rotor Assembled Lateral Runout Correction - On Vehicle Lathe**.

If the assembled LRO cannot be corrected using these methods, then other components must be suspected as causing and/or contributing to the LRO concern.

BRAKE ROTOR ASSEMBLED LATERAL RUNOUT CORRECTION - INDEXING

Tools Required

- **J 39544-KIT** Torque-Limiting Socket Set or equivalent. See **Special Tools**.
- **J 45101-100** Conical Brake Rotor Washers. See **Special Tools**.

CAUTION: Refer to **Brake Dust Caution** .

- IMPORTANT:**
- Brake rotor thickness variation **MUST** be checked **BEFORE** checking for assembled lateral runout (LRO). Thickness variation exceeding the maximum acceptable level can cause brake pulsation. Refer to **Brake Rotor Thickness Variation Measurement**.
 - Brake rotor assembled LRO exceeding the maximum allowable specification can cause thickness variation to develop in the brake rotor over time, usually between 4 800-11 300 km (3,000-7,000 mi). Refer to **Brake Rotor Assembled Lateral Runout Measurement**.

Indexing Procedure

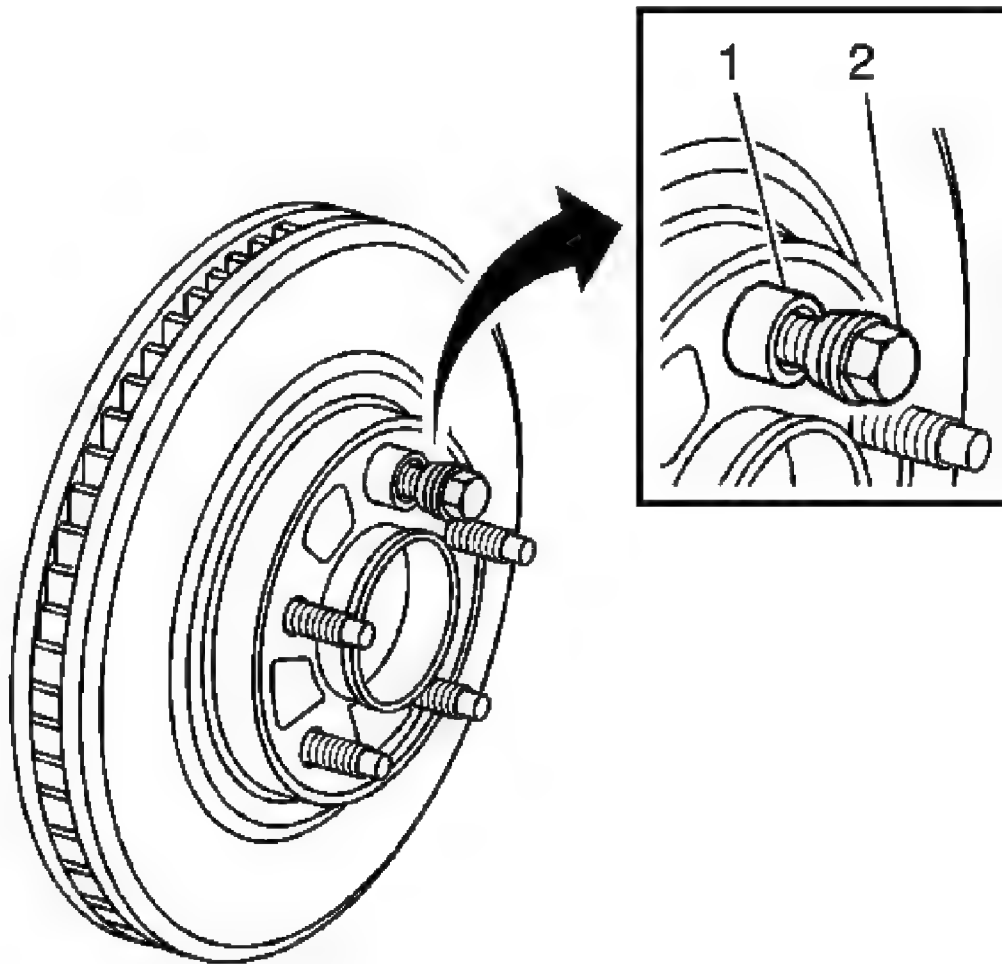


Fig. 44: Identifying J 45101-100 & Lug Nut
Courtesy of GENERAL MOTORS CORP.

1. Remove the **J 45101-100** and the lug nuts that were installed during the assembled LRO measurement procedure. See **Special Tools**.
2. Inspect the mating surface of the hub/axle flange and the brake rotor to ensure that there are no foreign particles or debris remaining.
3. Index the brake rotor in a different orientation to the hub/axle flange.
4. Hold the rotor firmly in place against the hub/axle flange and install one of the **J 45101-100** (1) and one lug nut (2) onto the upper-most wheel stud. See **Special Tools**.
5. Continue to hold the rotor secure and tighten the lug nut firmly by hand.

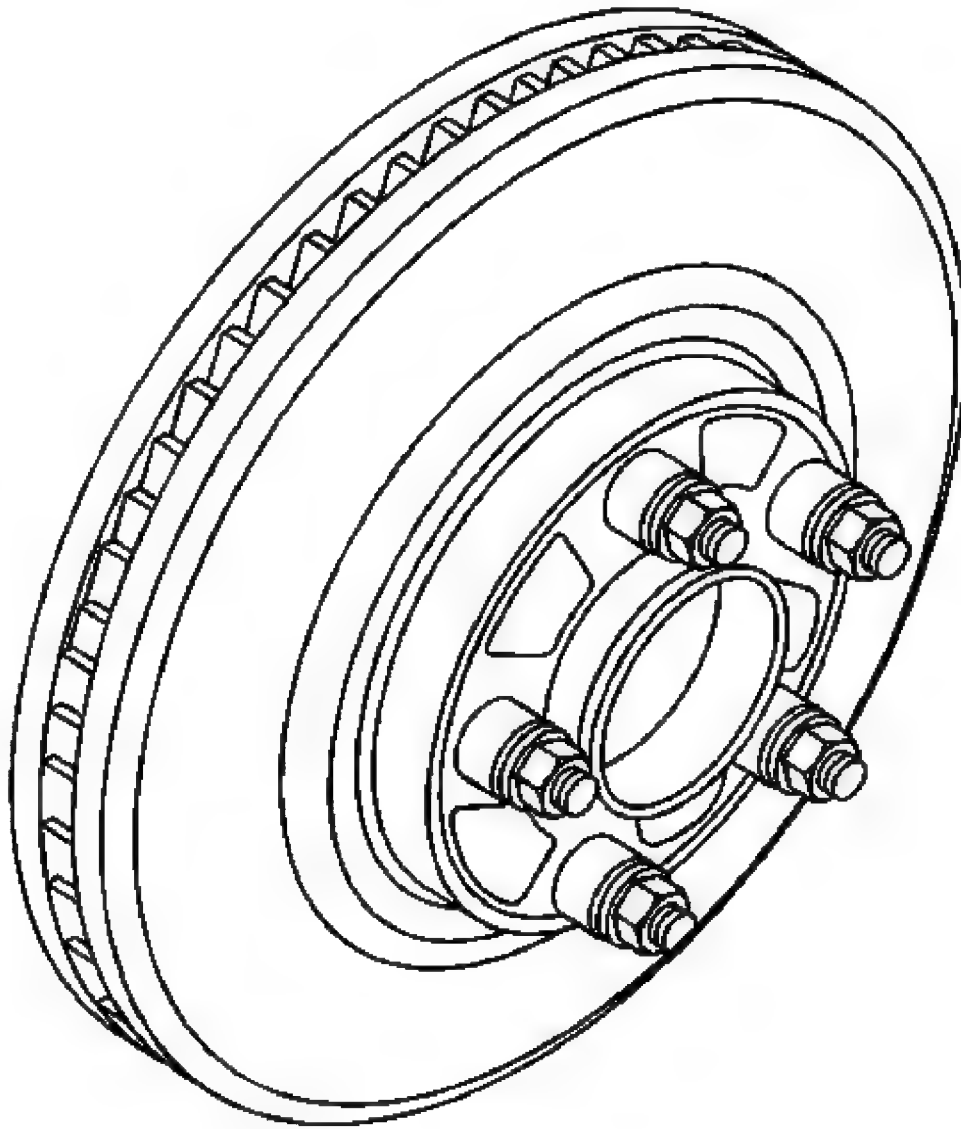


Fig. 45: Installing All J 45101-100s & Lug Nuts
Courtesy of GENERAL MOTORS CORP.

6. Install the remaining **J 45101-100** and lug nuts onto the wheel studs and tighten the nuts firmly by hand in a star-pattern. See **Special Tools**.
7. Using the **J 39544-KIT** or equivalent, tighten the lug nuts in a star-pattern to specification, in order to properly secure the rotor. See **Special Tools**. Refer to **Tire and Wheel Removal and Installation** .
8. Measure the assembled LRO of the brake rotor. Refer to **Brake Rotor Assembled**

Lateral Runout Measurement.

9. Compare the amount of change between this measurement and the original measurement.
10. If this measurement is within specifications, proceed to step 14.
11. If this measurement still exceeds specifications, repeat steps 1-9 until the best assembled LRO measurement is obtained.
12. Matchmark the final location of the rotor to the wheel studs if the orientation is different than it was originally.
13. If the brake rotor assembled LRO measurement still exceeds the maximum allowable specification, refer to **Brake Rotor Assembled Lateral Runout Correction.**
14. If the brake rotor assembled LRO is within specification, install the brake caliper and depress the brake pedal several times to secure the rotor in place before removing the **J 45101-100** and the lug nuts. See **Special Tools.**

BRAKE ROTOR ASSEMBLED LATERAL RUNOUT CORRECTION - CORRECTION PLATE PLATES**Tools Required**

- **J 39544-KIT** Complete Torque Socket Set-10 Pieces or equivalent. See **Special Tools.**
- **J 45101-100** Conical Brake Rotor Washers. See **Special Tools.**

CAUTION: Refer to Brake Dust Caution .

- IMPORTANT:**
- **Brake rotor thickness variation MUST be checked BEFORE checking for assembled lateral runout (LRO). Thickness variation exceeding the maximum acceptable level can cause brake pulsation. Refer to Brake Rotor Thickness Variation Measurement.**
 - **Brake rotor assembled LRO exceeding the maximum allowable specification can cause thickness variation to develop in the brake rotor over time, usually between 4 800-11 300 km (3,000-7,000 mi). Refer to Brake Rotor Assembled Lateral Runout Measurement.**

Correction Procedure

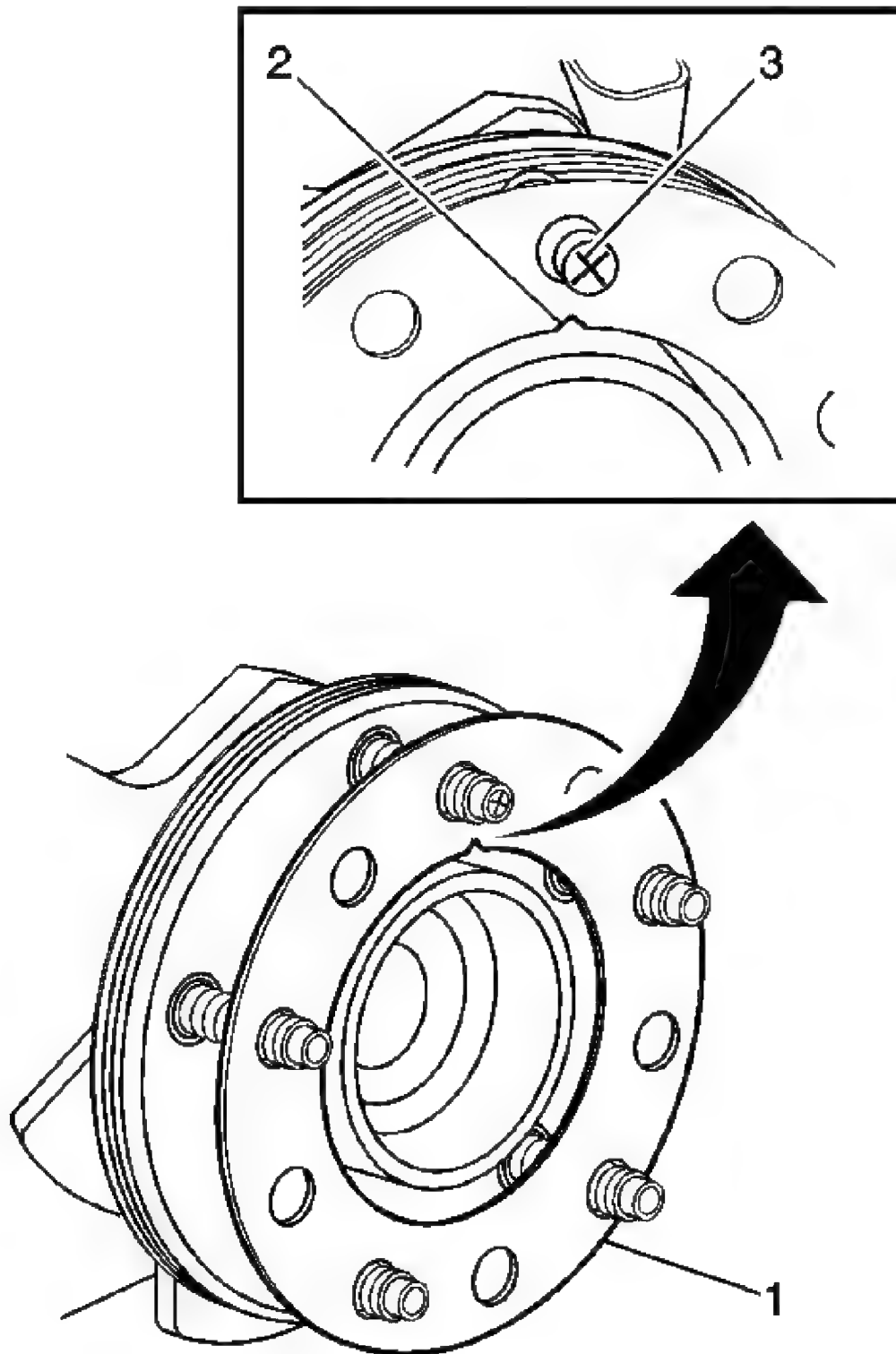


Fig. 46: Identifying Correction Plate, High Spot Mark & V-Shaped Notch

Courtesy of GENERAL MOTORS CORP.

1. Rotate the brake rotor to position the high spot, identified and marked during the brake rotor assembled LRO measurement procedure, to face upward.
2. Remove the **J 45101-100** and the lug nuts that were installed during the assembled LRO measurement procedure and/or the indexing correction procedure. See **Special Tools**.
3. Inspect the mounting surface of the hub/axle flange and the brake rotor to ensure that there are no foreign particles or debris remaining.
4. Select the correction plate, following the manufacturer's instructions, which has a specification closest to the assembled LRO measurement.

For example: If the assembled LRO measurement was 0.076 mm (0.003 in), the 0.076 mm (0.003 in) correction plate would be used. If the measurement was 0.127 mm (0.005 in), the 0.152 mm (0.006 in) correction plate would be used.

5. Determine the positioning for the correction plate (1) using the high spot mark (3) made during the brake rotor assembled LRO measurement procedure.

IMPORTANT:

- Do NOT install used correction plates in an attempt to correct brake rotor assembled LRO.
- Do NOT stack up or install more than one correction plate onto one hub/axle flange location, in an attempt to correct brake rotor assembled LRO.

6. Install the correction plate (1) onto the hub/axle flange, with the V-shaped notch (2) orientated to align with the high spot mark (3), that was positioned to face upward.

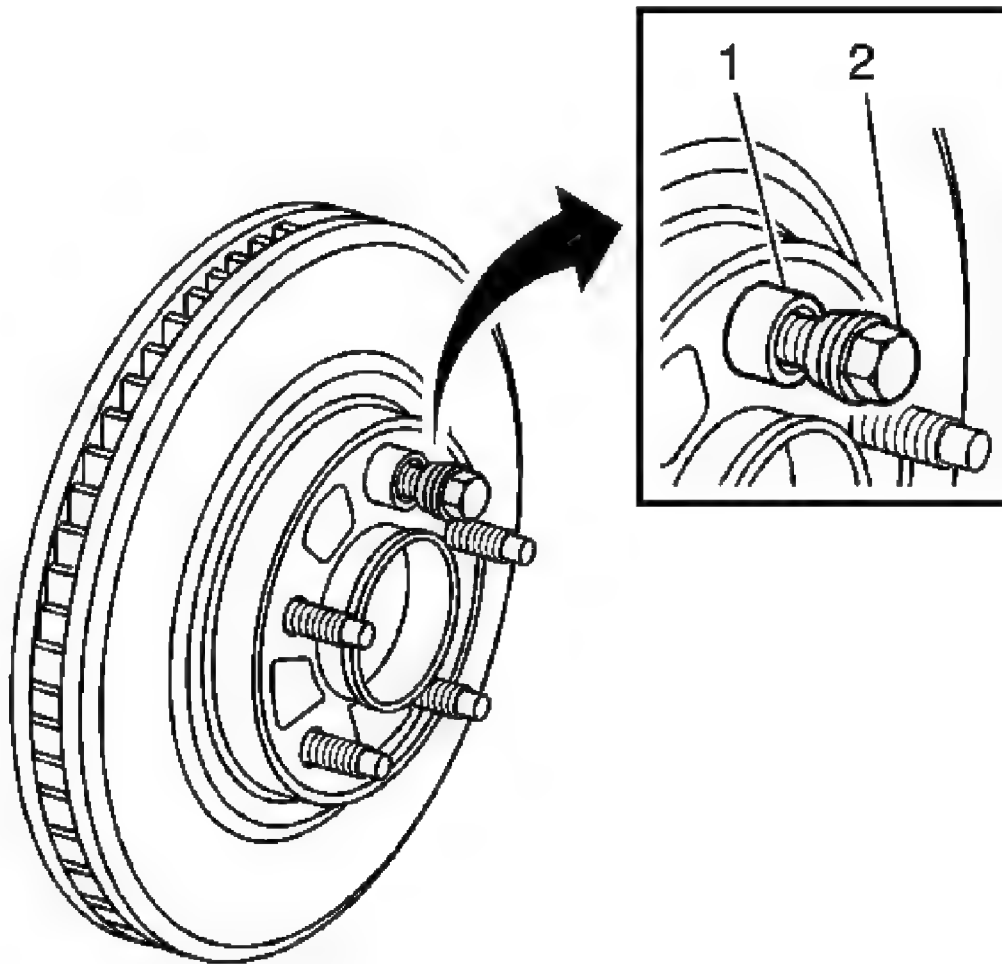


Fig. 47: Identifying J 45101-100 & Lug Nut
Courtesy of GENERAL MOTORS CORP.

7. Install the brake rotor to the hub/axle flange. Use the matchmark made prior to removal for proper orientation to the flange.
8. Hold the rotor firmly in place against the hub/axle flange and install one of the **J 45101-100** (1) and one lug nut (2) onto the upper-most wheel stud. See **Special Tools**.
9. Continue to hold the rotor secure and tighten the lug nut firmly by hand.

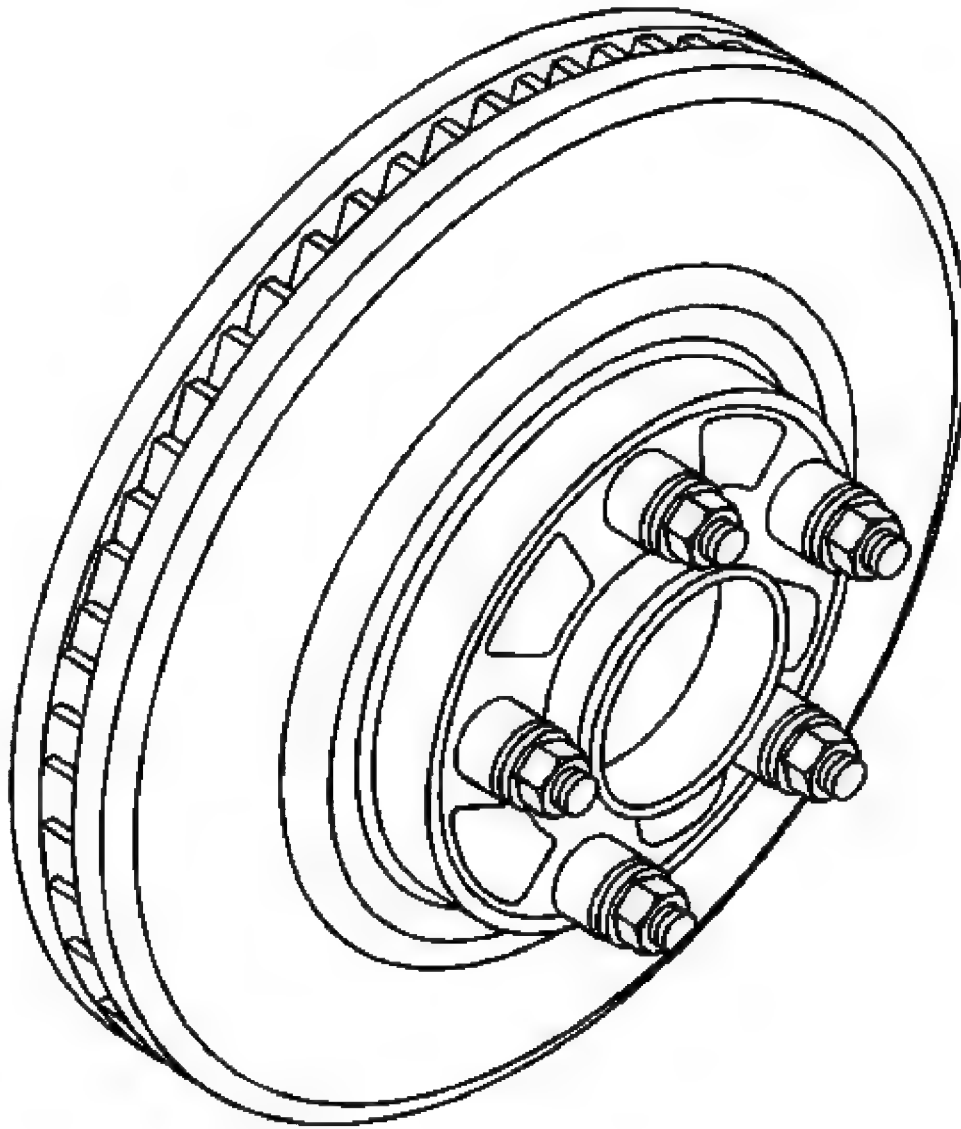


Fig. 48: Installing All J 45101-100s & Lug Nuts
Courtesy of GENERAL MOTORS CORP.

10. Install the remaining **J 45101-100** and lug nuts onto the wheel studs and tighten the nuts firmly by hand in a star-pattern. See **Special Tools**.
11. Using the **J 39544-KIT** or equivalent, tighten the lug nuts in a star-pattern to specification, in order to properly secure the rotor. See **Special Tools**. Refer to **Tire and Wheel Removal and Installation** .
12. Measure the assembled LRO of the brake rotor. Refer to **Brake Rotor Assembled**

Lateral Runout Measurement.

13. If the brake rotor assembled LRO measurement still exceeds the maximum allowable specification, refer to **Brake Rotor Assembled Lateral Runout Correction.**
14. If the brake rotor assembled LRO measurement is within specification, install the brake caliper and depress the brake pedal several times to secure the rotor in place before removing the **J 45101-100** and the lug nuts. See **Special Tools.**

BRAKE ROTOR ASSEMBLED LATERAL RUNOUT CORRECTION - ON VEHICLE LATHE**Tools Required**

J 45101-100 Conical Brake Rotor Washers. See **Special Tools.**

CAUTION: Refer to **Brake Dust Caution .**

IMPORTANT:

- **Brake rotor thickness variation MUST be checked BEFORE checking for assembled lateral runout (LRO). Thickness variation exceeding the maximum acceptable level can cause brake pulsation. Refer to Brake Rotor Thickness Variation Measurement.**
- **Brake rotor assembled LRO exceeding the maximum allowable specification can cause thickness variation to develop in the brake rotor over time, usually between 4 800-11 300 km (3,000-7,000 mi). Refer to Brake Rotor Assembled Lateral Runout Measurement.**

Procedure

1. Ensure that the caliper and caliper bracket that are already being supported, are clear from contacting any rotating components, such as the brake rotor.
2. Remove the **J 45101-100** and the lug nuts that were installed during the assembled LRO measurement procedure and/or the indexing correction procedure. See **Special Tools.**
3. Inspect the mounting surface of the hub/axle flange and the brake rotor to ensure that there are no foreign particles or debris remaining.
4. Set up the lathe, following the manufacturer's instructions.
5. Refinish the brake rotor, following the brake lathe manufacturer's instructions.
6. After each successive cut, inspect the brake rotor thickness. Refer to **Brake Rotor Thickness Measurement.**
7. If at any time the brake rotor exceeds the minimum allowable thickness after refinish specification, the brake rotor must be replaced. After replacing the rotor, proceed to step

- 10.
8. After refinishing the brake rotor, use the following procedure in order to obtain the desired non-directional finish:
 1. Follow the brake lathe manufacturer's recommended speed setting for applying a non-directional finish.
 2. Using moderate pressure, apply the non-directional finish:
 - If the lathe is equipped with a non-directional finishing tool, apply the finish with 120-grit aluminum oxide sandpaper.
 - If the lathe is not equipped with a non-directional finishing tool, apply the finish with a sanding block and 150-grit aluminum oxide sandpaper.
 3. After applying a non-directional finish, clean each friction surface of the brake rotor with denatured alcohol or an equivalent approved brake cleaner.
9. Remove the lathe from the vehicle.
10. Measure the assembled LRO of the brake rotor. Refer to **Brake Rotor Assembled Lateral Runout Measurement**.
11. If the brake rotor assembled LRO measurement still exceeds the maximum allowable specification, refer to **Brake Rotor Assembled Lateral Runout Correction**.
12. If the brake rotor assembled LRO is within specification, install the brake caliper and depress the brake pedal several times to secure the rotor in place before removing the **J 45101-100** and the lug nuts. See **Special Tools**.

BRAKE ROTOR REFINISHING

Tools Required

- **J 41013** Rotor Resurfacing Kit. See **Special Tools**.
- **J 42450-A** Wheel Hub Resurfacing Kit. See **Special Tools**.

CAUTION: Refer to **Brake Dust Caution** .

- IMPORTANT:**
- The disc brake rotors do not require refinishing as part of routine brake system service. New disc brake rotors do not require refinishing.

Do not refinish disc brake rotors in an attempt to correct the following conditions:

- **Brake system noise - squeal, growl, groan**
- **Uneven and/or premature disc brake pad wear**

- Superficial or cosmetic corrosion/rust of the disc brake rotor friction surface
- Scoring of the disc brake rotor friction surface less than the maximum allowable specification
- Before refinishing a brake rotor, the rotor **MUST** first be checked for adequate thickness to allow the rotor to be refinished and remain above the minimum allowable thickness after refinish specification. Refer to Brake Rotor Thickness Measurement.

Disc brake rotors should only be refinished if they have adequate thickness to be refinished and if one or more of the following conditions exist:

- Thickness variation in excess of the maximum allowable specification
- Excessive corrosion/rust and/or pitting
- Cracks and/or heat spots
- Excessive blueing discoloration
- Scoring of the disc brake rotor surface in excess of the maximum allowable specification
- Disc brake rotors may need to be refinished as part of the process for correcting brake rotor assembled lateral runout (LRO) that exceeds the maximum allowable specification.

IMPORTANT: If the vehicle is equipped with cross-drilled rotors, use a lathe with positive rake tooling. This setup requires less cutting pressure, which will result in less vibration and a better surface finish. Also, use a vibration dampener when cutting. Otherwise, refinish according to the following instructions.

Refinishing Procedure

IMPORTANT: Whenever the brake rotor has been separated from the hub/axle flange, clean any rust or contaminants from the hub/axle flange and the brake rotor mating surfaces. Failure to do this may result in increased assembled lateral runout (LRO) of the brake rotor, which could lead to brake pulsation.

1. Using the **J 42450-A** , thoroughly clean any rust or corrosion from the mating surface of the hub/axle flange. See **Special Tools**.
2. Using the **J 41013** , thoroughly clean any rust or corrosion from the mating surface and mounting surface of the brake rotor. See **Special Tools**.
3. Inspect the mating surfaces of the hub/axle flange and the rotor to ensure that there are no foreign particles or debris remaining.
4. Mount the brake rotor to the brake lathe according to the lathe manufacturer's instructions, ensuring that all mounting attachments and adapters are clean and free of debris.
5. Ensure that any vibration dampening attachments are securely in place.
6. With the brake lathe running, slowly bring in the cutting tools until they just contact the brake rotor friction surfaces.
7. Observe the witness mark on the brake rotor. If the witness mark extends approximately three-quarters or more of the way around the brake rotor friction surface on each side, the brake rotor is properly mounted to the lathe.
8. If the witness mark does not extend three-quarters or more of the way around the brake rotor, re-mount the rotor to the lathe.
9. Following the brake lathe manufacturer's instructions, refinish the brake rotor.
10. After each successive cut, inspect the brake rotor thickness. Refer to **Brake Rotor Thickness Measurement**.
11. If at any time the brake rotor exceeds the minimum allowable thickness after refinish specification, the brake rotor must be replaced.
12. After refinishing the brake rotor, use the following procedure in order to obtain the desired non-directional finish:
 1. Follow the brake lathe manufacturer's recommended speed setting for applying a non-directional finish.
 2. Using moderate pressure, apply the non-directional finish:
 - If the lathe is equipped with a non-directional finishing tool, apply the finish with 120-grit aluminum oxide sandpaper.
 - If the lathe is not equipped with a non-directional finishing tool, apply the finish with a sanding block and 150-grit aluminum oxide sandpaper.
 3. After applying a non-directional finish, clean each friction surface of the brake rotor with denatured alcohol or an equivalent approved brake cleaner.
13. Remove the brake rotor from the brake lathe.
14. Measure the assembled LRO of the brake rotor to ensure optimum performance of the disc brakes. Refer to **Brake Rotor Assembled Lateral Runout Measurement**.
15. If the brake rotor assembled LRO measurement exceeds the specification, bring the LRO to within specifications. Refer to **Brake Rotor Assembled Lateral Runout**

Correction.**DESCRIPTION AND OPERATION****DISC BRAKE SYSTEM DESCRIPTION AND OPERATION****System Component Description**

The disc brake system consists of the following components:

Disc Brake Pads

Applies mechanical output force from the hydraulic brake calipers to friction surfaces of brake rotors.

Disc Brake Rotors

Uses mechanical output force applied to friction surfaces from the disc brake pads to slow speed of tire and wheel assembly rotation.

Disc Brake Pad Hardware

Secures disc brake pads firmly in proper relationship to the hydraulic brake calipers. Enables a sliding motion of brake pads when mechanical output force is applied.

Disc Brake Caliper Hardware

Provides mounting for hydraulic brake caliper and secures the caliper firmly in proper relationship to caliper bracket. Enables a sliding motion of the brake caliper to the brake pads when mechanical output force is applied.

System Operation


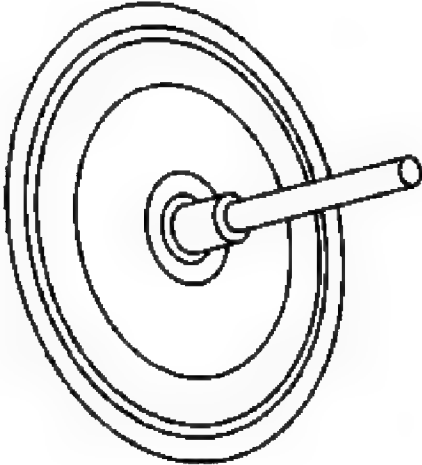
Mechanical output force is applied from the hydraulic brake caliper pistons to the inner brake pads. As the pistons press the inner brake pads outward, the caliper housings draw the outer brake pads inward. This allows the output force to be equally distributed. The brake pads apply the output force to the friction surfaces on both sides of the brake rotors, which slows the rotation of the tire and wheel assemblies. The correct function of both the brake pad and brake caliper hardware is essential for even distribution of braking force.

SPECIAL TOOLS AND EQUIPMENT**SPECIAL TOOLS****Special Tools**

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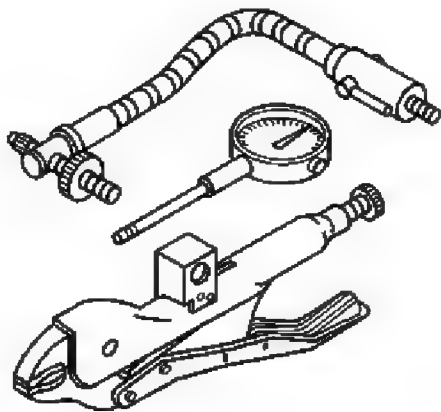
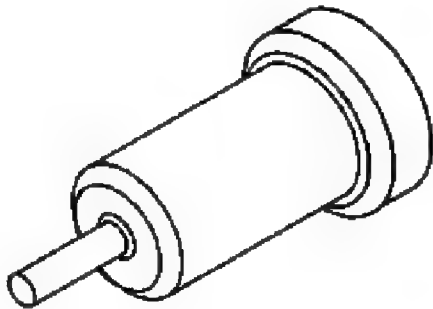
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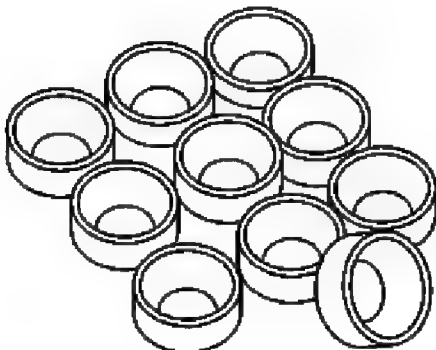
Illustration	Tool Number/Description
	<p>J 39544-KIT Torque Limiting Socket Set</p>
	<p>J 41013 Rotor Resurfacing Kit</p>
	<p>J 42450-A Wheel Hub Resurfacing Kit</p>

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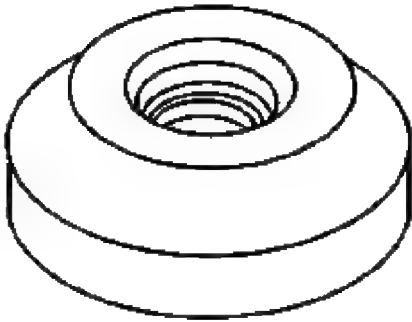
J 45101
Hub and Wheel Runout Gage



J 45101-100
Conical Brake Rotor Washers

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J 45863
Boot Seal Installer



J 8092
Driver Handle

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